

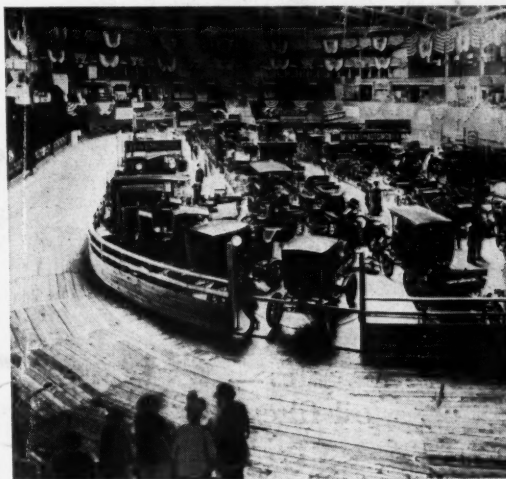


# MOTOR AGE

CHILTON PUBLICATION  
DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

NOVEMBER  
1937

## IN THIS ISSUE



The first Auto Show at the Madison Square Garden in 1900. Note the track for trying out the cars.

### New Cars

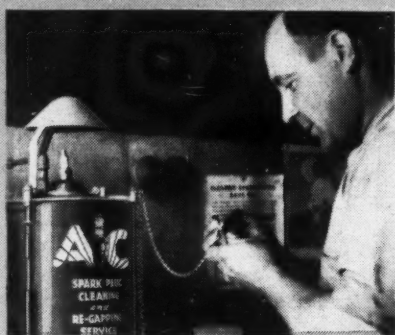
Complete details of the new cars displayed at the 37th annual Automobile Show in New York are contained in this issue. Regardless of whether you stay home or attend the show you will find the descriptions of the new cars of great interest and help in your business.

### Short Cuts

On transmission service. Here is an article you will want to paste in your hat so you will always have it with you.

### A.S.I. Show

The next issue of Motor Age is a special number devoted to the new products announced this fall, many of which will be displayed at the A. S. I. Show in Chicago. It will be a regular buyer's guide for every shop owner and service station manager.



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**SPARK PLUGS**  
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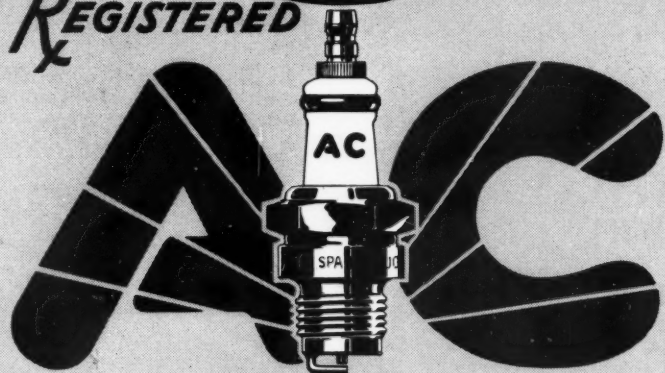
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THE NEW

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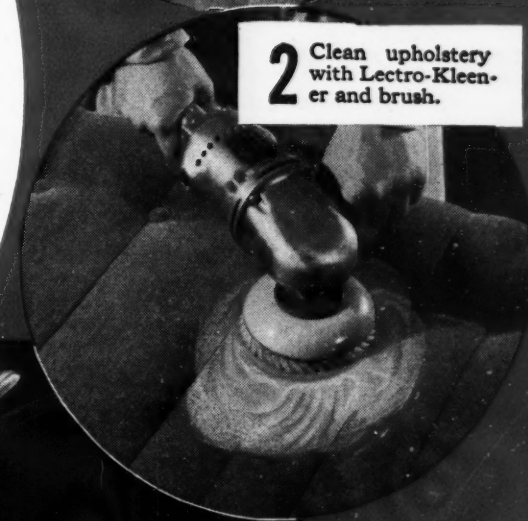
—Because you can turn out a *complete* car cleaning job, inside and out, at a real profit—and because you can turn out the type of work that brings in more business. The new Lectro-Kleen Process pays for itself quickly in any garage, auto laundry or service station—or solves the car dealer problem of “appearance reconditioning” trade-ins for quick resale. Powerful suction of Vackar gets out embedded dirt. The concentrated Lectro-Kleener removes spots and renews fabric. Lectro machine polish restores new-car luster to any paint job. Ask your Van Dorn Jobber—or write for details today. The Van Dorn Electric Tool Co., 727 Joppa Road, Towson, Maryland. (Div. of Black & Decker Mfg. Co.)



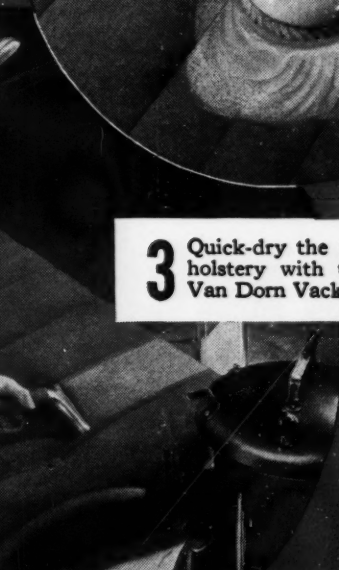
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LECTRO-KLEEN  
PROCESS



**1** Remove dust and dirt with the Vackar.



**2** Clean upholstery with Lectro-Kleener and brush.



**3** Quick-dry the upholstery with the Van Dorn Vackar.

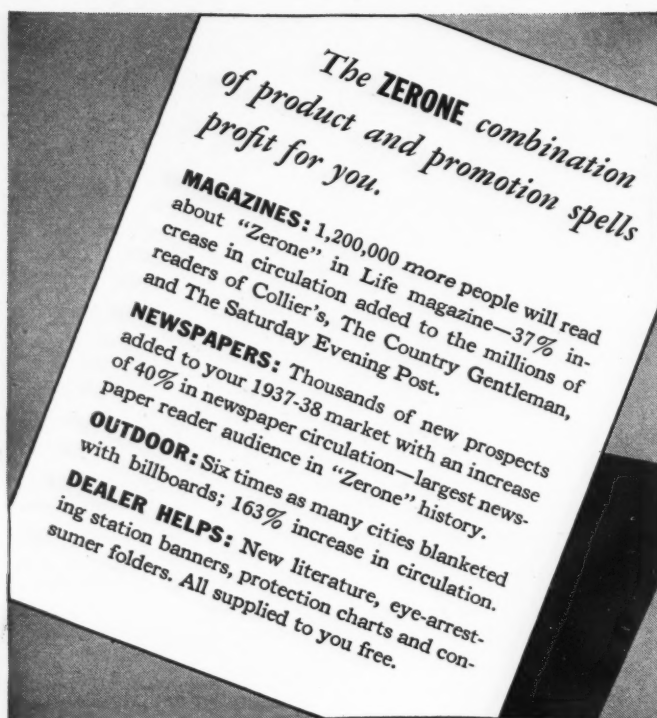


**4** Polish car with the Polisher and Lectro Machine Polish.

its  
not  
late!

IGAN

# More money in your POCKETBOOK



**T**O BE SURE, the "Zerone" promotion campaign this winter is the largest and most inclusive in our history. But more important perhaps even than that is the product itself. "Zerone" is the economical anti-freeze for all motorists to use. The basic materials from which "Zerone" is made are so efficient that car owners need less to give complete protection, and get improved engine performance in the bargain. Add to these things effective rust prevention, and that sums up the product story. The price—\$1.00 a gallon (slightly higher west of the Rockies). Finally, it's made by Du Pont, a guarantee of quality.

Impartial surveys of anti-freeze buying habits clearly indicate today that "Zerone" is selling right at the top. If you haven't handled "Zerone," you owe it to yourself to check with your "Zerone" jobber today, and get in a supply.

Du Pont, "ZERONE" Division, Wilmington, Del.



# ZERONE

REG. U. S. PAT. OFF.

## Anti-Rust ANTI-FREEZE



DEVOTED TO THE INTERESTS OF THE INDEPENDENT  
REPAIR SHOP

*Subscriptions for Motor Age are accepted only from independent repair shops and their employees.*

Vol. LVI, No. 12

November, 1937

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Offices: Philadelphia, Phone Sherwood 1424. New York City, 239 W. 39th Street, Phone Pennsylvania 6-1100; Chicago, Room 916, London Guarantee & Accident Bldg., Phone Franklin 9494; Detroit, 1015 Stephenson Bldg., Phone Madison 2090; Cleveland, 609 Guardian Bldg., Phone Main 6860; Washington, D. C., 1061 National Press Bldg., Phone District 6877; San Francisco, 444 Market Street, Room 395, Phone Garfield 6788; Long Beach, Calif., 1595 Pacific Ave., Phone Long Beach 618-238. Subscription Price: United States and Possessions, Postal Union Countries \$2.00 per year; Canada and foreign, \$3.00 per year. Single copies, 25c.

Owned and Published by



CHILTON COMPANY  
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Chestnut and 56th Streets, Philadelphia, U. S. A.

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# MOTOR AGE NOVEMBER 1937

## SHOP TALK

### On The Spot

Turning the spotlight on the new cars displayed at the New York Automobile show, we find many points of interest to the repair man. The changes made in the cars are given in this issue. Detailed service procedure will be given on individual cars and units in an early issue of **MOTOR AGE**. One thing is sure, and that is even greater accuracy will be required in tuning these engines because of the higher compression ratios.

### A. S. I. Show

Just now I am on the lookout for a motor scooter to help me cover the Automotive Service Industries Show in Chicago. It is being held on the Navy Pier again. Last year it took me three hours to walk to the end of the pier and back and that was without stopping but two or three times when some one button-holed me. This year the show is even bigger with 373 manufacturers using 1010 booths. And I have to stop at each one of them to make sure that we have a description of all their latest gadgets. Some job! So send on your scooters. The December issue will be an illustrated catalog of all the latest parts, equipment, accessories and supplies displayed at the A.S.I. Show and also those new products produced by manufacturers not displaying at the show. Watch for it,

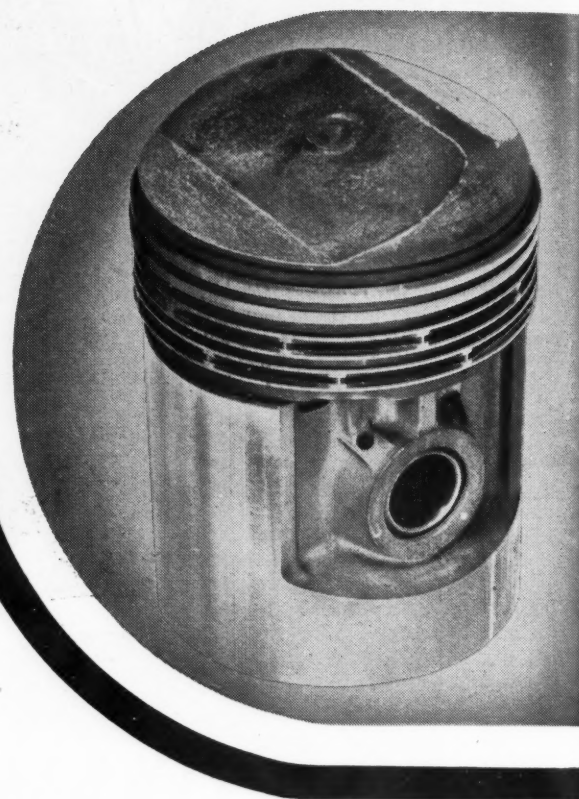
you will find it a big help in selecting the latest units for use in your shop or for resale to the customers.

### Pick Your Team

Cliff Oppel of Duluth and Loy Watts of Colville, Wash., seem to have a difference of opinion in regards to the trouble H. H. Roe is having with a hopped-up Stude. Cliff sides with my diagnosis, but Loy says the valve timing is haywire. As Roe also hails from Duluth, I suggest that Cliff and he get together and see if they can't get that job to wind up. Incidentally, I saw Ed Neil the other day (Ed used to be with Chilton), and he seems to side with Loy Watts. Anyone wishing to place any bets can send me the money, as I have appointed myself official stake holder.

*Bill Tobolsky*

# BUICK



**T**HREE basic engineering changes, as well as a fourth which is optional, characterize the Buick line for 1938. The basic changes incorporated in the entire line are—new spring suspension comprising four coil springs with the Buick knee-action in front; original combustion chamber design with domed piston head producing increased power and greater smoothness; new body mounting eliminating all manner of road shock. In addition, Buick offers on the Series 40 only, the self-shifting transmission as an option installed at the factory.

For next year, the Buick line comprises Series 40 on 122 in. wheelbase;

Series 60 on 126 in. wheelbase; Series 80 on 133 in. wheelbase; and Series 90 on 140 in. wheelbase. The 80 and 90 wheelbases are upped 2 in. over last year to take advantage of the new suspension. The 40 and 60 continue the hypoid gear set of last year except for the use of Hyatt barrel type roller bearings on the differential side mounting. The hypoid gear is extended to the 80 and 90.

Bodies remain the same on the 40 and 60, with new bodies for the 80 and 90 following the lines of the smaller models. Front end styling has been altered to some extent with straight up-and-down radiator grille profile

and using two die-cast radiator grille frames.

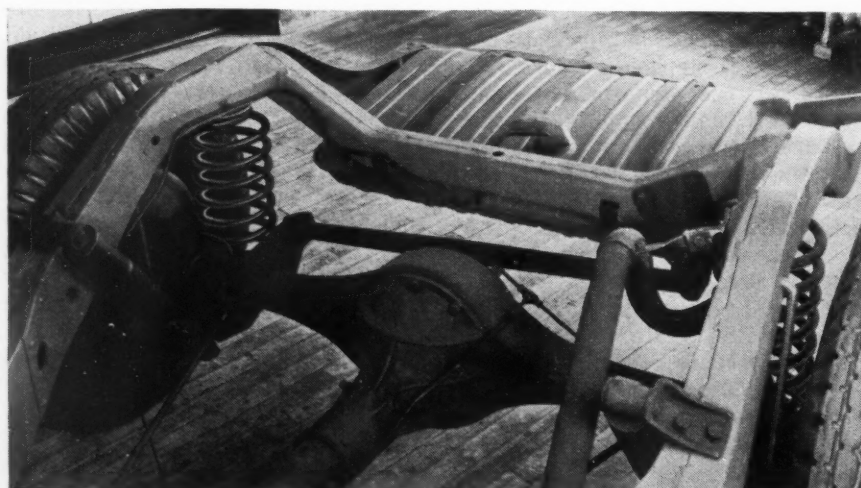
Principal mechanical units such as the engine, transmission, clutch, axle, torque tube, etc., remain the same throughout but with large or detail changes to be noted. With the use of coil springs at the rear Buick has eliminated eight lubrication points in the rear on all models and in addition four lubrication points have been eliminated at the front on the 40 and 60 with the new steering hook-up.

With some modifications, the clutch design is continued as before. However, pedal pressure has been further decreased by using an over-center pedal return spring hook-up.

Transmission remains the same but on the Series 40, the synchronizers now are of two-lobe instead of three-lobe construction with hexagonal retaining springs instead of the detent springs used last year.

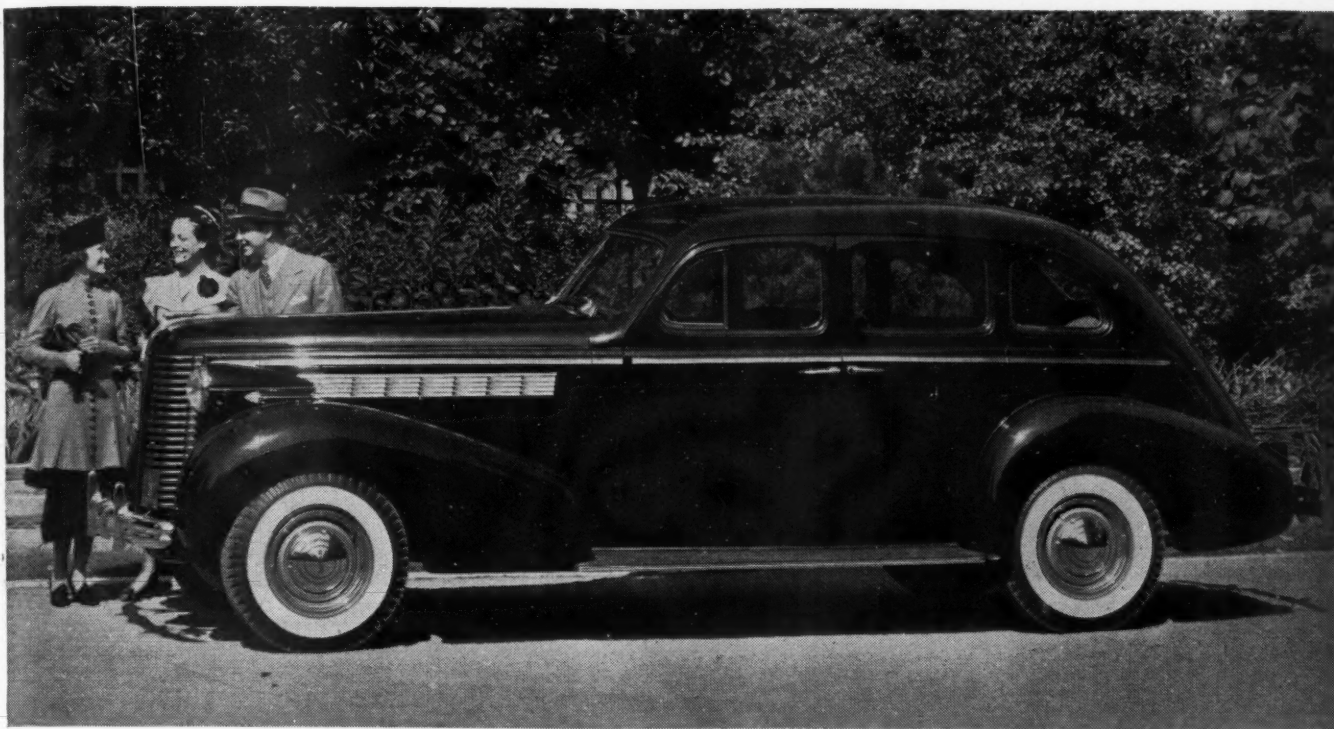
Front end sheet metal changes include the use of fixed hood sides with hinged lid to provide access for ordinary service operations. This stiffens the front end sufficiently to make possible the elimination of the customary radiator braces, and cuts weight. Front fenders are mounted independently of the frame and are insulated so as to prevent the transference of road shocks and weave.

The concentric bowl carburetor developed by Bendix is continued but has been greatly improved in characteristics by special metering which maintains an idling jet action at all speeds, thus eliminating the momentary surge or roughness under certain conditions in the transition from



Coil springs replace the conventional leaf springs at the rear





The appearance of this Century model four door sedan, is characteristic of the entire Buick line for 1933

idling to power jet. New Marvel carburetors having similar functional characteristics also will be used.

The new Delco battery with end-to-end cell assembly and bedded connectors, is mounted under the hood on the hood ledge with a baffle wall which scoops air at the front and sweeps it around the battery for ventilation and cooling.

Engines remain the same but their performance is quite improved due to the introduction of new combustion design. This has been accomplished by the development of a unique piston dome, converting the conventional Buick combustion chamber into an advanced profile design. This, in combination with increased compression ratio has increased power output some seven per cent on the 40 and eight per cent on the 60. Pistons are of aluminum alloy, anodized, as previously.

The Series 40 engine is 8 cyl., 3 3/32 in. bore x 4 1/8 in. stroke. Valve-in-head, 248 cu. in. displacement, rated 107 hp. at 3400 r.p.m. Last year it was rated 100 hp. at 3200 r.p.m. Compression ratio has been upped to 6.15 to 1 from 5.7 to 1.

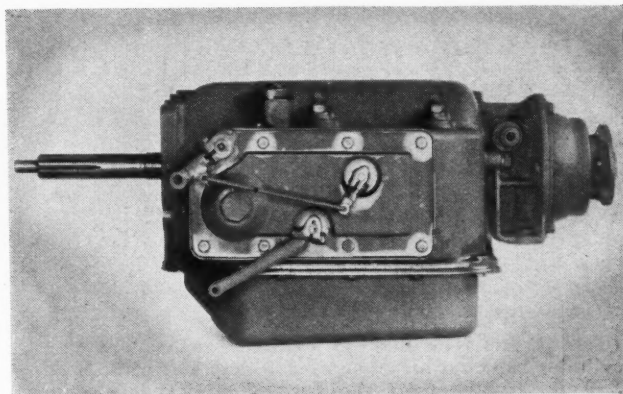
Series 60 engine is Valve-in-head, 8 cyl., 3 7/16 in. bore x 4 5/16 in. stroke, 320 cu. in. displacement, rated 141 hp. at 3600 r.p.m., being upped from 130 hp. at 3400 r.p.m., Compression ratio has been increased from 5.9 to 6.35 to 1.

Engine control has been simplified by combining the automatic choke control with the vacuum-controlled starter switch so that engine operation is practically automatic and fool-proof under all conditions. All engine bearings now are made from special lead-babbitt alloy. The generator has been relocated and is mounted in a rigid bracket on the side of the water jacket.

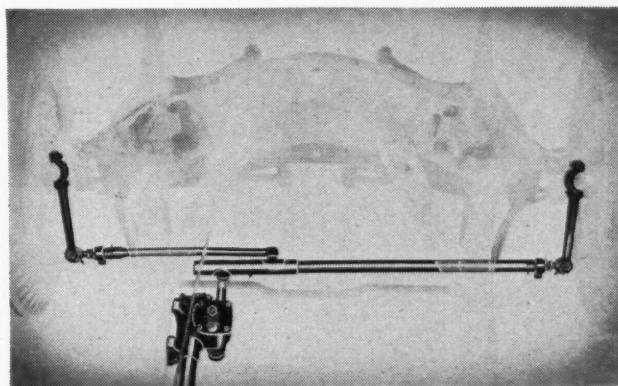
Spring suspension on all models comprises four coil springs with knee-action at the front but conventional axle at the rear. The two rear coil springs are mounted in a spring seat on the axle housing behind the axle, thus increasing spring base by some five inches. Delco direct-acting, low-pressure shock absorbers are used at the rear. With coil springs, Buick retains the torque tube drive using a heavier torque tube and, in addition, a radius rod reaching diagonally from a bracket on the right hand side of the axle housing to a bracket on the frame. The radius rod is an interesting member made of stampings in the form of a

(Continued on page 88)

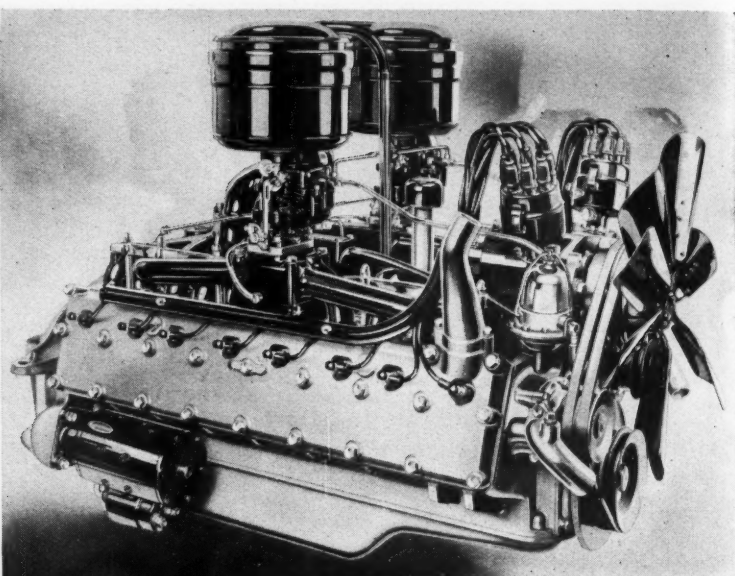
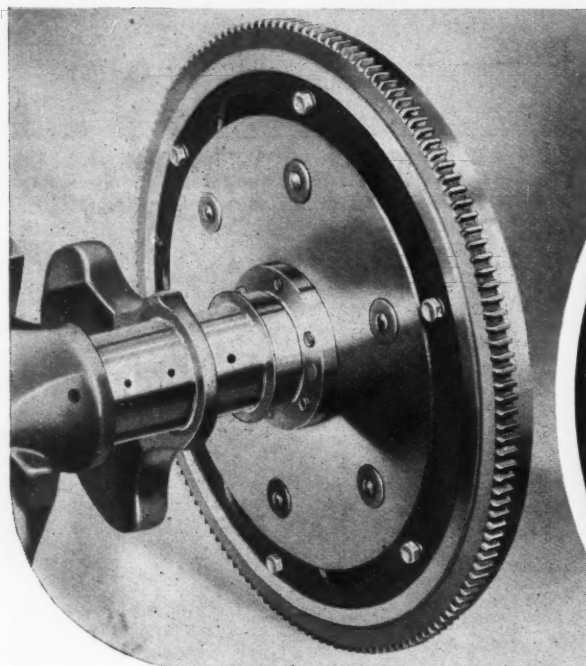
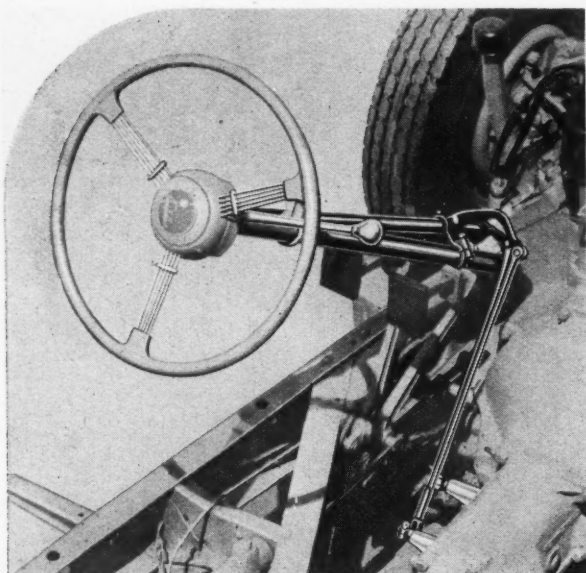
(Left) Pistons are now of the dome type and permit a higher compression ratio than used in the past



The self shifting transmission is available on the model 40 only



Details of the new steering layout



# CADILLAC LA SALLE

(Top Right) The new 16 cylinder engine has the cylinder banks at an angle of 135 deg. and while it is 250 lb. lighter than the former model develops 185 hp.

(Top Left) Details of the transmission shifting mechanism

(Above) Flywheel is now attached to the crankshaft through a flexible steel disk, thus reducing vibration

CADILLAC enters the 1938 Show season with some striking news for its public. First is its style leader—the Series 60—available in only one body, the Sportsman's Sedan on 127 in. wheelbase. This car has a low hung body without running boards in advanced styling.

Next is the new V-16 with a newly developed V-16 engine having a 135 degree V which makes it practically a flat engine. The complete car will weigh almost 1000 pounds less than the Cadillac V-12's of last year and is said to weigh considerably less than any other V-12 on the '38 market.

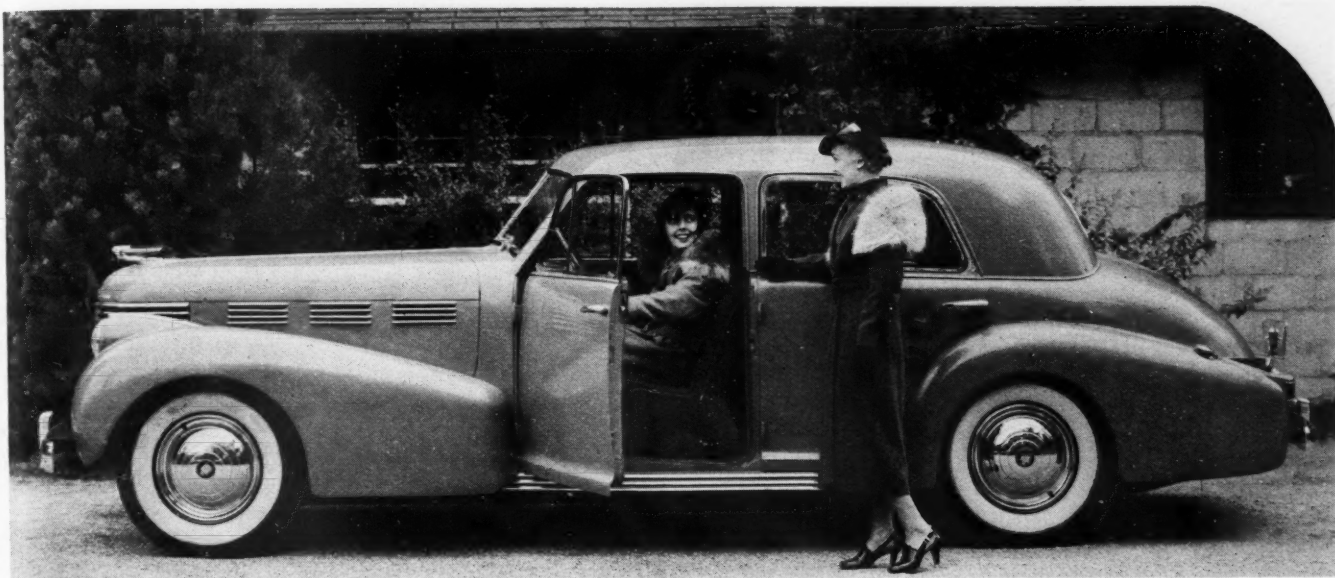
The Cadillac V-12 line has been

dropped entirely so that the line for '38 consists of LaSalle, Cadillac 60, V-8, and V-16. In the simplification of mechanical detail, Cadillac will feature only four wheelbases, five chassis, and three engines. However, there will be 35 bodies instead of 34 for last year. All Cadillac models have longer wheelbases.

For '38, Cadillac will provide remote control of transmission shifting as standard equipment, eliminating the floor board gear shift lever entirely. This control mechanism is wholly mechanical and was developed by Cadillac.

Mechanically, the LaSalle and V-8





chassis and units are substantially the same as last year, with some changes to be noted. The 60 chassis is new so far as frame and arrangement of units are concerned. The V-16 chassis has new details.

Mechanically the V-8 engines remain unchanged except for details to be noted. LaSalle is V-8, L-head, 3 1/2 in. bore x 4 1/2 in. stroke, 322 cu. in. displacement, rated 125 hp. at 3400 rpm. with 6.25 to 1 compression ratio.

Cadillac V-8 is 3 1/2 in. bore x 4 1/2 in. stroke, 346 cu. in. displacement, rated 135 hp. at 3400 rpm. with 6.25 to 1 compression ratio. Compression ratio of 5.75 to 1 is optional on all V-8's. Because of the longer wheel-base and larger bodies on the 75 line, the engine intended for the 75 chassis will have a higher rating by virtue of higher compression ratio. This job will have standard compression ratio of 6.7 to 1; optional ratios of 6.25 and 5.75 to 1. Horse power rating with higher compression ratio is 140 at 3400 rpm. Ethyl gasoline is specified for use with this engine.

#### The Cadillac 60 is considered the style leader

As illustrated, the big feature of the Cadillac V-8's is the addition of a torsional vibration dampener and a novel "damped bending flywheel" which produces great smoothness and quietness throughout the entire operating range. Its chief function is to eliminate the effects of crankshaft bending vibration.

Instead of the usual rigid casting, the rim of the new design is attached to the crankshaft by a flexible steel disc which is rigid torsionally but flexible in bending. On both sides of the supporting disc are damping plates which press against the flexible flywheel web. When an engine runs

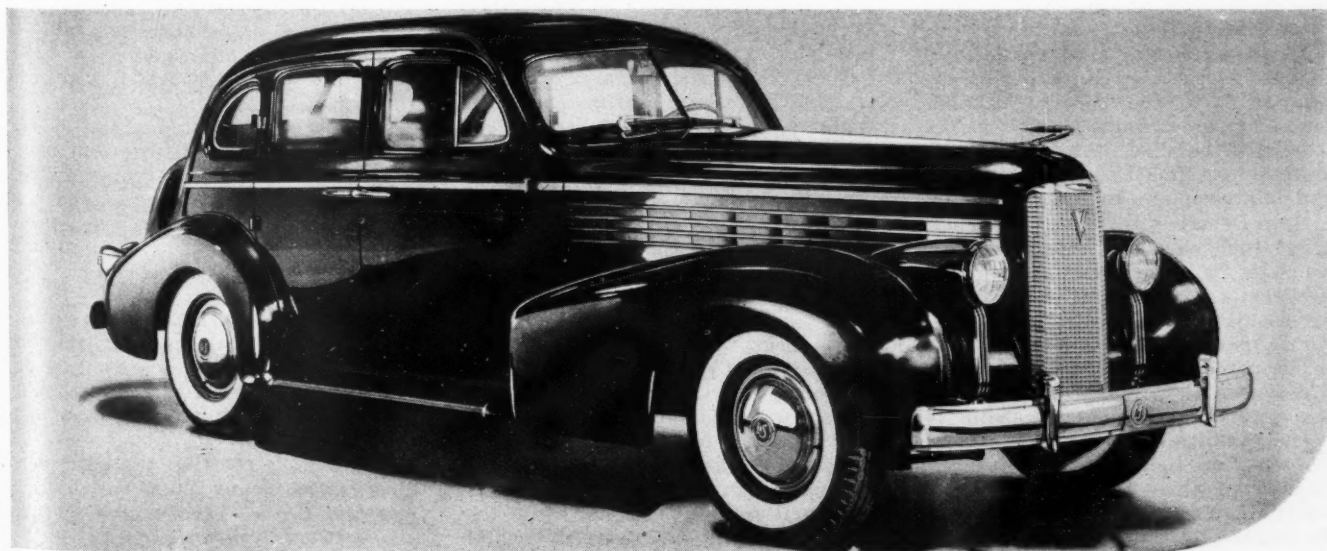
at speeds at which synchronous crankshaft bending occurs, the usual rigid flywheel will move with the crankshaft which causes the flywheel to run with a wobbling motion producing engine noise. With the new design, the flexibility of the flywheel web permits the flywheel rim to run in a true circle, regardless of crankshaft deflection. If the crankshaft bends, however, the damping plates of the flexible flywheel will rub against the flywheel web, thus absorbing energy and damping the motion of the crankshaft.

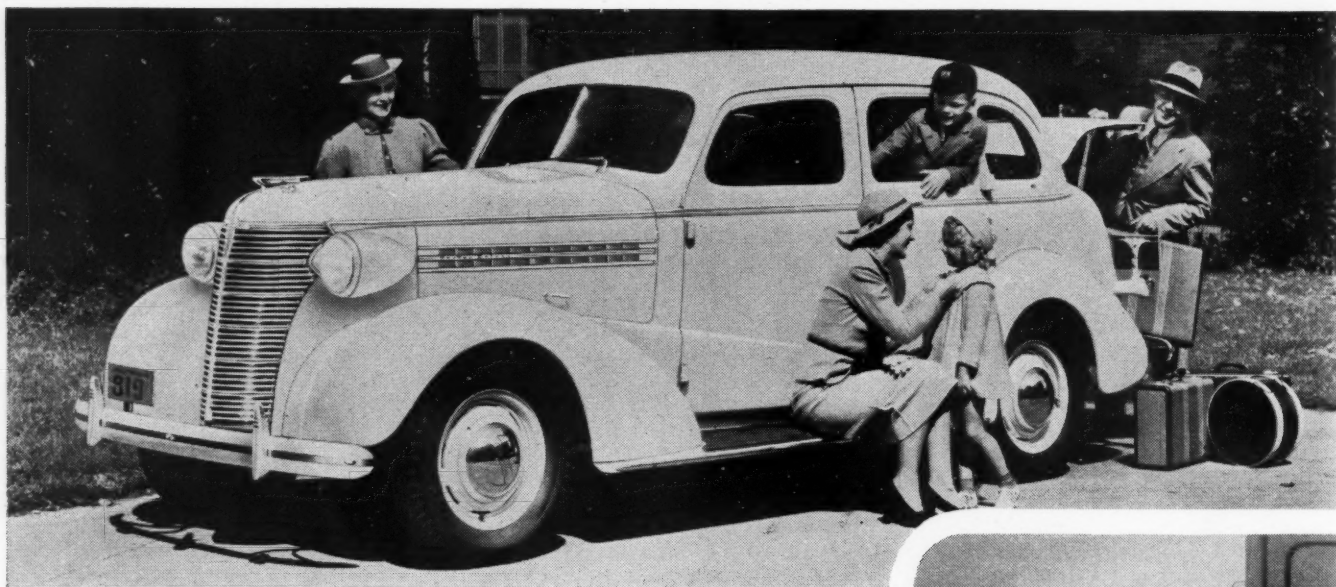
A positive rear main bearing oil seal of asbestos composition packing replaces the former slinger type seal. Cooling on all models has been improved by a substantial increase in area of radiator grille openings. The use of an oil filter for the protection of the hydraulic valve silencer mechanism has been found unnecessary and the oil filter is now discontinued.

Carburetion has been improved. On the Carter carburetor, standard on

Appearance of the LaSalle has been improved through detailed changes

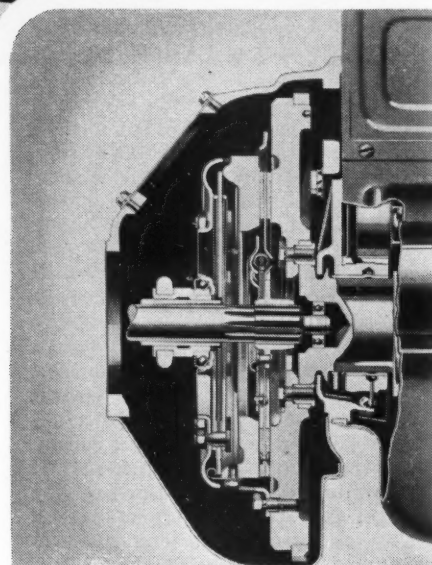
(Continued on page 68)





# CHEVROLET

By JOSEPH GESCHELIN



(Top of Page) Chevrolet Master deluxe sport sedan

(Above) Details of the new clutch

TWO basic models—the Master Deluxe and the Master—are offered by Chevrolet for 1938. Front end styling has been greatly improved with a modern touch continuing the underlying "speed line" of last year. Bodies remain the same although rear seat clear width has been increased two inches by an increase in rear tread from 57 9/16 to 59 in.

Mechanically, the most outstanding change is a unique clutch design developed for the '38 models which differs from any production job in use today. Otherwise, the same basic units are continued with modifications and improvements to be noted later.

New Deluxe style features include hood rounded into radiator grille which is flat-topped and is made in two removable sections. Hood side panels are an inch longer and incorporate new louvre treatment.

The new clutch is designed around a diaphragm spring which has the shape of a dished washer with 18 tapering fingers pointing inward. Pressure of the throw-out bearing on the inner ends of the fingers causes a diaphragm action, the outer ends of the fingers, near the rim, pivoting on

the foremost of two fulcrums provided by two rings, one on each side of the spring. This action causes the rim of the spring and the pressure plate to move away from the clutch disk, bringing about disengagement. While the clutch is engaged, the tapered fingers approximate a flat position, and the entire rim of which they are a part bears against the pressure plate.

When the clutch pedal is released and the throw-out bearing no longer contacts the fingers, the "spring" in this material causes the fingers to pivot about the rear fulcrum ring and the rim to bear again against the pressure plate.

To conform to the new design, the pressure plate and cover are new. The former is simpler in design than the 1937 part and has a flange with a crown near its rim for contact with the new diaphragm spring. Three retracting springs keep it in constant contact with the spring and thus prevent rattle. More uniform distribution of loading, by use of the diaphragm spring, further reduces distortion of the plate as, while the clutch is being engaged, there are

eighteen points of load contact on the plate as compared to three points in 1937. In complete engagement the contact is continuous on the flange of the plate whereas, in 1937, there were nine separate points of contact.

Another important feature in the 1938 clutch is the ball throwout bearing, which replaces the graphite bearing used in previous years. The new bearing, of sealed type, is packed with a high temperature lubricant which makes further lubrication unnecessary.

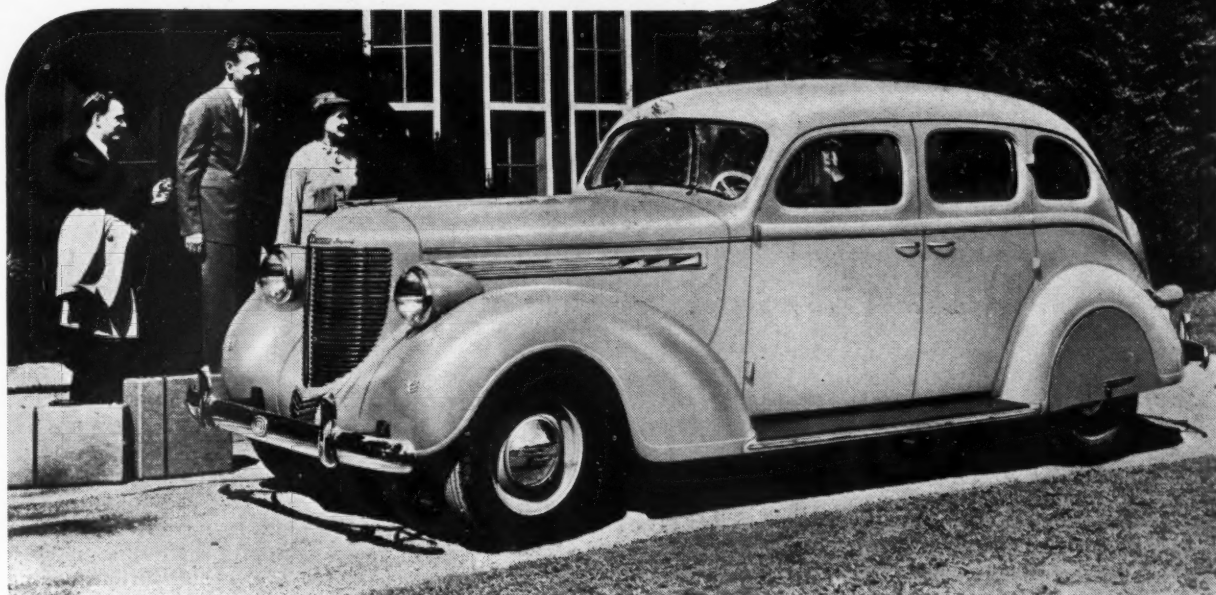
The synchro-mesh transmission remains essentially the same except that the former die-cast case has been replaced by a pressed steel housing, lighter but much stronger than formerly.

The engine remains the same but incorporates many important refinements. It is valve-in-head, 6-cyl.,

(Continued on page 59)



# CHRYSLER



Note the new frontal appearance on the Chrysler Royal

TWO lines, the Chrysler Royal and the Chrysler Imperial with its companion model, Chrysler Custom Imperial, completely restyled with new front end treatment, comprise the Chrysler offerings for the new season.

Mechanically, the Chrysler lines are continued without change except for many details of improvement and refinement based upon the service history of the past season. Such outstanding features as—floating power engine mounting, front independent suspension, all-steel bodies with one-piece steel top, direct-acting shock absorbers, hydraulic brakes, and many other familiar features are continued into the 1938 season.

Hypoid axles and rubber-suspended body mountings also are retained. The synchro-silent transmission has been greatly improved by the use of the new blocker-type synchronizers for second and high speed gears. The overdrive transmission unit is standard on the Custom Imperial; optional at extra cost on the Royal and Imperial.

Hydraulic brakes are continued, with vacuum power on the Custom Imperial, using Centrifugal drums on all models. Drum diameter has been increased to provide greater stopping ability as follows: to 11 inches on the

Royal, 12 inches on the Imperial, and 14 inches on the Custom Imperial. Parking brake is mounted on the rear of the transmission with cable pull and cast iron drums. The handbrake lever is mounted under the center of the instrument panel.

Engines remain the same and continue the well-known Chrysler features. However, the stroke of both the Royal and the Imperial engines has been increased— $\frac{1}{4}$  in. more on the Royal,  $\frac{3}{8}$  in. more on the Imperial. The Royal engine is 6-cyl., L-head,  $3\frac{3}{8}$  in. bore x  $4\frac{1}{2}$  in. stroke, 241.5 cu. in. displacement, rated 95 hp. at 3600 r.p.m. with 6.2 to 1 compression ratio and cast iron head. With optional aluminum head and 7.1 to 1 compression ratio, the engine is rated 102 hp.

A new camshaft with earlier opening and closing of the intake valves now is a feature of the Royal engine. This, combined with large valves and ports, improves power output at lower speeds and is said to improve acceleration. Full-length water jackets, also, are a feature of this engine, with the main oil gallery immediately in contact with the jackets at their lower ends, thus providing oil cooling.

The Imperial eight engine now is 8-cyl., L-head,  $3\frac{1}{4}$  in. bore x 4 in. stroke, 298.6 cu. in. displacement,

rated 110 hp. at 3400 r.p.m., with cast iron head and standard compression ratio of 6.2 to 1. It has the same rating as last year but operates at lower engine speed and with decreased compression ratio. With special aluminum heads, the Imperial engine has a rating of 115 hp. at 3400 r.p.m. with compression ratio of 6.5 to 1.

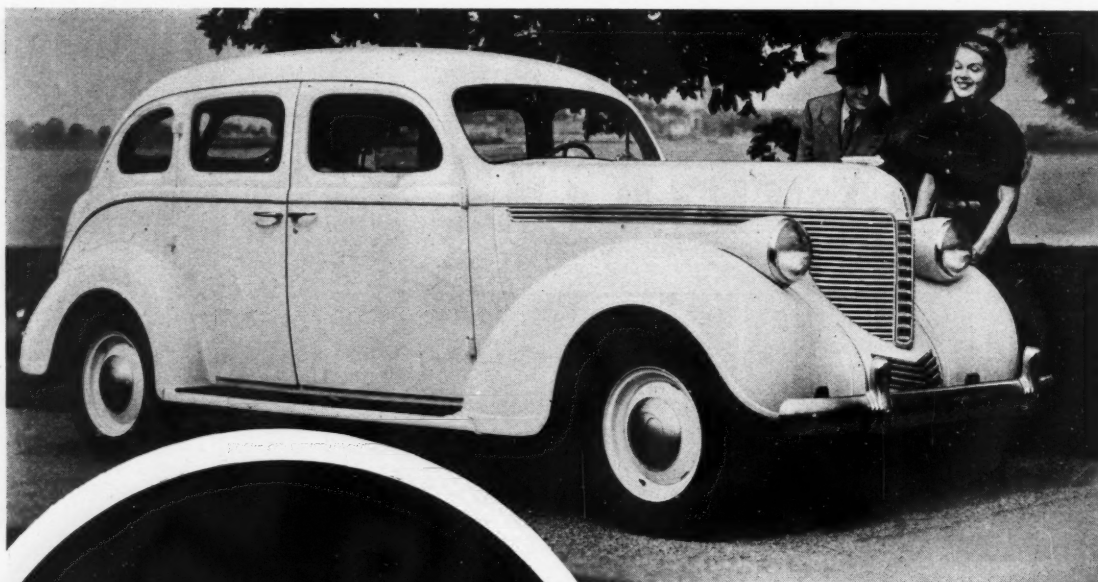
The Custom Imperial remains the same—8-cyl., L-head,  $3\frac{1}{4}$  in. bore x  $4\frac{1}{2}$  in. stroke, 323.5 cu. in. displacement, rated 130 hp. at 3400 r.p.m. with aluminum head and compression ratio of 6.5 to 1. Optional compression ratio of 7.45 to 1 with a special aluminum head boosts power to 138 hp.

Single plate, dry, ventilated clutches are continued. The diameter of the Imperial clutch has been increased from 10 to 11 in.

New X-type frames are used. The strength of the front end of the frames has been greatly increased by the use of a new crossmember which is very rigid and substantial. The channel members of the X are tapered from where they join the side members to the center, resulting in a center section of unusual depth. Gusset plates riveted to the top and bottom add strength to the center section.

The rear motor support crossmem-

(Continued on page 87)



(Top) the 4-door sedan is illustrative of the new DeSoto line

The center section of the X-member has been strengthened and is now 9½ in. deep

A NEW frame, wider, deeper and stronger than before; bigger, more powerful hydraulic brakes; ride improvements that set a new high in cushioning qualities; wheelbase increased from 116 to 119 in.; and a new rubber-insulated steering set-up that isolates road shocks from the wheel—those are the highlight features of the improvements made in the new DeSoto.

DeSoto's distinctive new "face" features a radiator grille made up of horizontal chromium bars, die-cast for added strength. These sweep back along the hood to form the side louvers of the car.

The hood of the car is hinged at the center and opens from the side with an easy to operate hood lock. Side panels, which also act as supports for the radiator, are bolted into place and are easily removed. The windshield is more than an inch deeper this year, giving 12 per cent more vision and allowing drivers to see overhead traffic lights and the like clearly. In both the trunk and luggage compartments of the new DeSoto more space has been gained by mounting the extra wheel vertically at the rear of the compartments.

The seat is mounted on a ramp and rises approximately one inch when moved from rear to forward position by means of the new seat adjuster. A compensating spring makes this action easy. Further in connection with front seat comfort is the removal of the hand brake lever to the dash.

The new frame is bigger, stronger, deeper and far more rigid than before. The side rails of the frame have been increased from 5½ to 6 in. in depth. The side members are joined together by a sturdy X-member and rugged cross-members. Completely new this year are two sub side-rail members at the dash line, giving more rigidity at the portion of the frame which carries the greatest burden of body weight. The rear motor support cross-member has also been strengthened. The center of the X-member is a full 9½ in. deep this year. Gusset plates riveted to the top and bottom of this open "dog house" add strength.

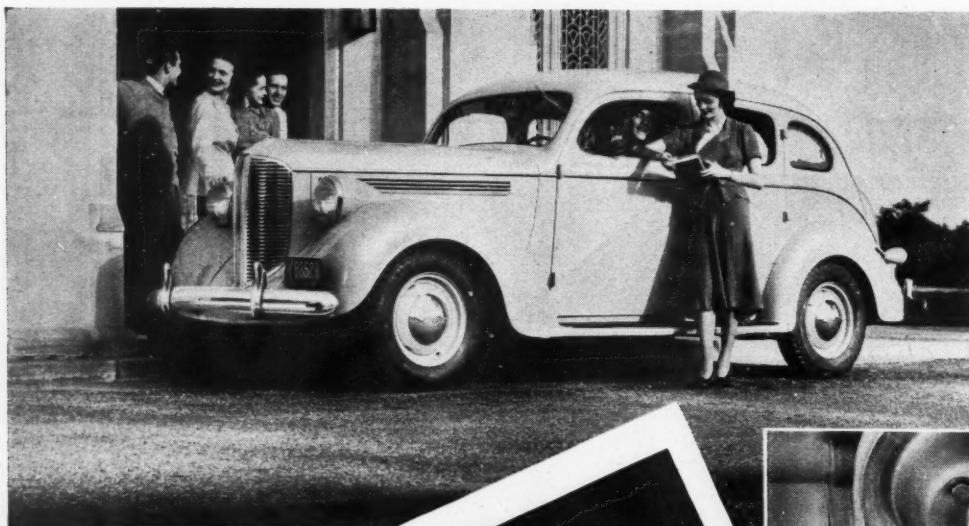
The new frame is approximately 5 in. wider than before at the dash line and 7 in. wider where the steering gear is attached. This greater width cuts down sway and gives the whole car greater stability on curves. The wider frame has permitted DeSoto engineers to mount some of the fourteen rubber float body mountings directly on the side

(Continued on page 58)





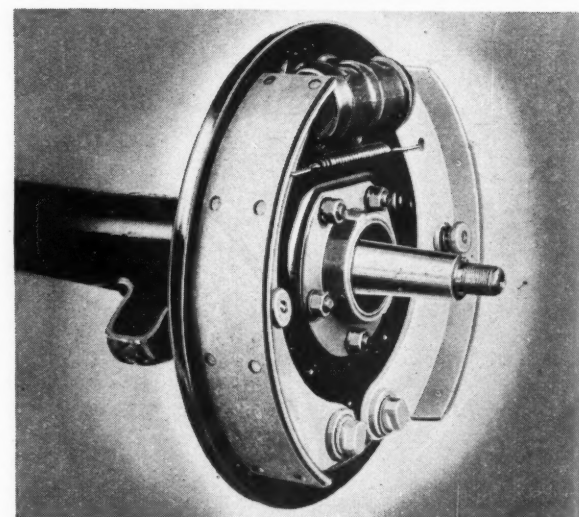
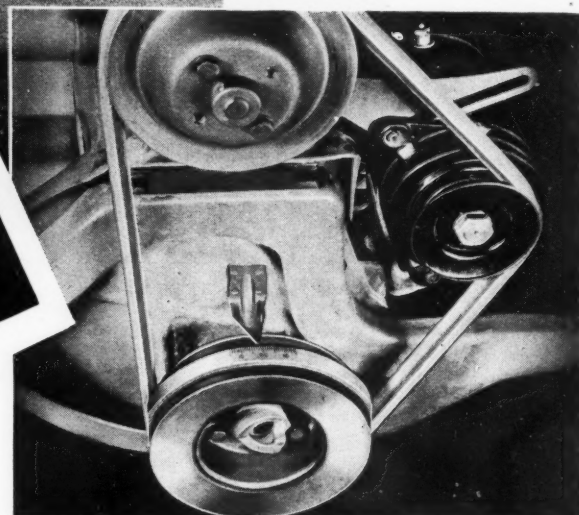
**"Johnson, what I sent you to town for was a gasket!"**



(Left) New radiator grille and fenders enhance the appearance of the 1938 Dodge

(Directly Below) A new impulse neutralizer with rubber element, reduces vibration

(Bottom) Brake drums have been increased from 10 in. to 11 in. in diameter



**D**ODGE again offers a single line of cars carrying a six-cylinder powerplant but available in two wheel-base lengths of 115 in. and 132 in. and with a choice of ten body styles.

While no radical changes have been made in either body or chassis design, improvements made to enhance the appearance, comfort or performance total no less than 47. Entirely new are the radiator shell and grille, and new features are embodied also in the hood louvers, fenders and their mountings, windshield, instrument panel, seat adjustment, head lamps, door and luggage compartment locks, brake drums, engine impulse neutralizer, muffler, clutch facings, clutch baffle and release bearings, generator and interior treatment.

Silencing of the bodies has been carried a step further. The steel roof, the rear quarters and the cowl are insulated with heavy padding. Body sides and door panels are covered with a plastic material that is cemented to the metal surfaces. A gum-like substance is sprayed on the under side of rear-deck lids, which

latter are formed of two metal panels with padding between them.

Dodge bodies are mounted on outriggers on the frame through the intermediary of spool-shaped rubber cushions, which feature further contributes to the silent operation.

The engine is a six-cylinder L-head of 3¼-in. bore by 4½-in. stroke. Engine features like the full-length water jackets, steel valve inserts, pressure lubrication, aluminum pistons, automatic choke and spark advance are continued, some in modified form. The modifications include such details as a new spool-shaped support in the "floating-power" engine mounting, a rubber-cushioned impulse neutralizer, an exhaust silencer of new construction, and a new-type compression ring in the pistons.

Several improvements have been made in the clutch mechanism. The release bearing is larger and its self-

lubricating capacity greater. The driven clutch disk has a baffle preventing oil from reaching the friction disks. The clutch facings are provided with grooves that assist in keeping the clutch cool and in breaking a vacuum that might affect the rapidity of clutch action. Minor improvements have been made in the Dodge synchro-silent three-speed transmission. The parking brake is now applied and released by a "pistol-grip" lever located in the center of the instrument panel. The diameter of the cast-iron brake drums has been increased from 10 to 11 inches.





The Fiat, Balilla four door standard sedan delivers for \$795



**FIAT** enters the American motor car picture for 1938 with three "Riviera-styled" cars featured by the new "500," a car designed to sell for less than \$600 in this country and built to give better than 47 miles per gallon of gasoline.

Safety equipment includes all-metal bodies, four wheel hydraulic brakes, emergency brakes operating on the transmission and safety glass all-round.

The "500" is powered with a four-cylinder motor which develops 13 horsepower at 4000 r.p.m. and gives speeds up to 55 miles per hour. At 40 miles per hour, road tests have developed gasoline mileage of better than 50 miles per gallon it is claimed. Valves in the L-head motor are actuated directly by the camshaft which is driven by a silent roller chain.

The "500" line is available in two body styles, the standard coupe with all-metal body construction, and the cabriolet. The latter model has a "one-finger" sliding top, a feature unique to the American motoring public, and incorporates a new and fool-proof principle in convertible top adjustment.

Independent front-wheel suspension and hydraulic brakes combine with new principles of weight distribution to give the "500" exceptional riding qualities. Rear springing is semi-cantilever with hinged torque arms. The motor is mounted ahead of the front axle which serves the double purpose of providing increased room for passengers and, at the same time, by scientific weight placement gives a

smoother ride for the passengers.

There are four forward speeds and reverse, with synchromesh transmission and silent third speed. It has a full torque tube drive with flexible coupling at each end. The clutch is of the single-plate, dry type, mounted on a flexible hub.

The principle of the straight-line drive is employed—the crank-shaft axis being on a straight line with the differential. This feature gives a low center of gravity with ample road clearance.

Steering is by worm and sector in the "500." Wheelbase is 78¾ in.

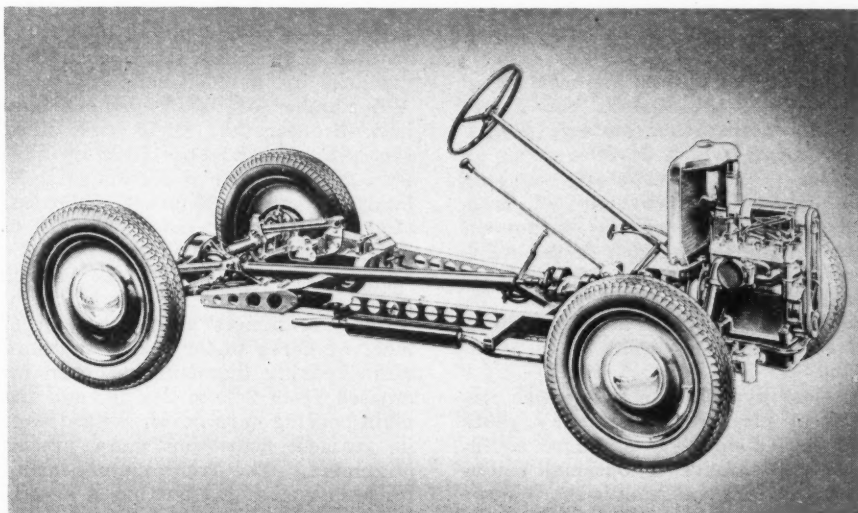
The entire engine, clutch and gear-

box assembly is rubber mounted. Cylinder blocks are phosphor-manganese cast iron with aluminum cylinder heads.

Supporting the "500" are two larger cars, the "508/c," known as the "Balilla," and the "1500," which also follow the European ideal of gasoline economy.

Both cars feature the Continental streamlining favored by Fiat. Four-door sedan bodies are of all-metal pillarless construction which makes for easier access to front and rear compartments.

The 4-cylinder "Balilla" motor, with  
(Continued on page 87)



Details of the Fiat 500 chassis showing engine mounted ahead of the front axle. The standard coupe delivers for \$565



# GRAHAM

by JOSEPH GESCHELIN

**S**PARKLING new styling and eye-appeal characterize the Graham line for 1938. For next season Graham offers just two lines—the Graham Special and the Supercharger—mounted on a 120 in. wheelbase chassis with the same styling and bodies.

Eye-appeal features are striking in their distinctiveness being built around a new all-steel body, new sheet metal, and new front end treatment. With numerous changes and refinements, the power plant and other units remain substantially the same. Only one basic engine will be used this year, with and without the supercharger.

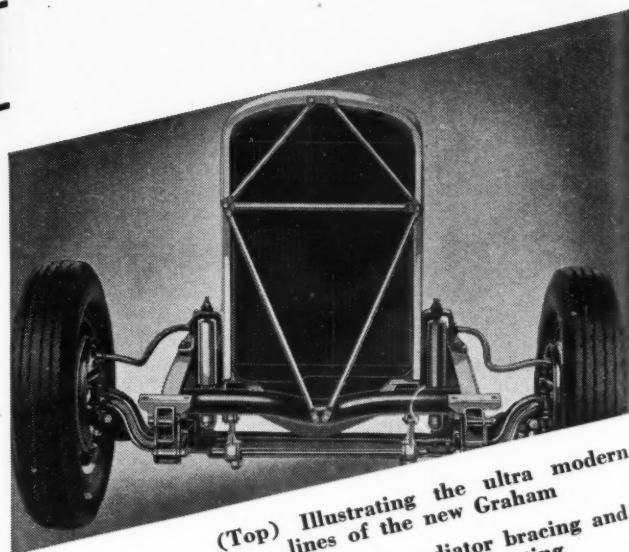
One of the interesting mechanical features of the line is the Evans vacuum-mechanical remote gear shifting control which is offered as an option. This incorporates a long gear shift lever curving out from under the center of the instrument panel within easy reach of the steering wheel. The length of this lever makes it possible to shift gears by hand without vacuum assist whenever engine vacuum is weak or unavailable.

Spicer hypoid rear axle which has been in production for many years has been adopted as standard equipment. Overdrive is optional equipment. The transmission is the Warner roll-over type with side-mounted shifter rails.

Basically, the engine is 6-cyl., L-

head,  $3\frac{1}{2}$  in. bore x  $4\frac{3}{8}$  in. stroke, 218 cu. in. displacement with compression ratio of 6.7 to 1 and aluminum head. With supercharger the engine is rated 116 hp. at 4000 rpm.; without blower for the Special it is rated 90 hp. at 3600 rpm.

A number of detail changes have been incorporated. In the first place, the cylinder head and block top have been altered so as to accommodate 33 studs instead of 20 previously used; stud size has been cut from 7/16 to  $\frac{1}{2}$  in. The object of this is to provide a still more rigid support at the top of the block in the interest of maintaining roundness and better alignment of bores under load conditions. Main bearing diameter has been increased from  $2\frac{1}{4}$  to  $2\frac{3}{8}$  in. and the main bearing caps now fit with dowels in reamed holes for more precise alignment. The front main bearing remains unchanged but has a special shouldered shell which serves the same purpose. Tin-plated, Bohnalite Autothermic pistons are continued.



(Top) Illustrating the ultra modern lines of the new Graham  
(Above) Note the radiator bracing and shock absorber mounting

On the supercharged engine, the exhaust manifold now is made in two separate sections, one for each bank of three cylinders, with separate exhaust pipes leading to the muffler. This change has been made to better handle the higher temperatures, and to eliminate the strains set up in the block when the exhaust manifold is under thermal strain.

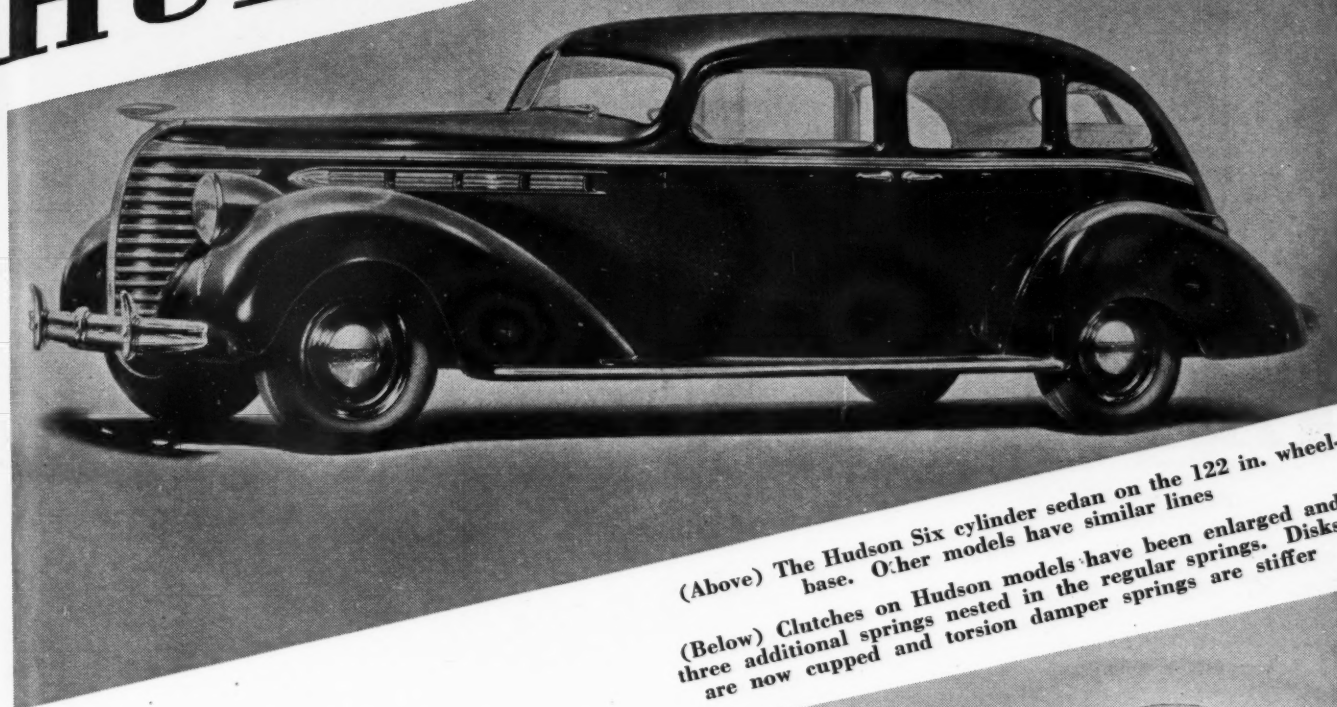
Fuel pump cooling is handled very ingeniously. The engine pan is made in two sections, the section at the engine being carried up to the water jacket above the case so that it serves as a baffle between the exhaust pipes and the engine side. In effect, this places the fuel pump outside the pan where it is exposed to the cooler atmosphere under the car.

Clutch is  $9\frac{1}{2}$  in. Long semi-centrifugal on both models. The new Spicer hypoid axle has the same ratio as last year's axles, e.g., 4.27 to 1 standard and 4.55 to 1 optional.

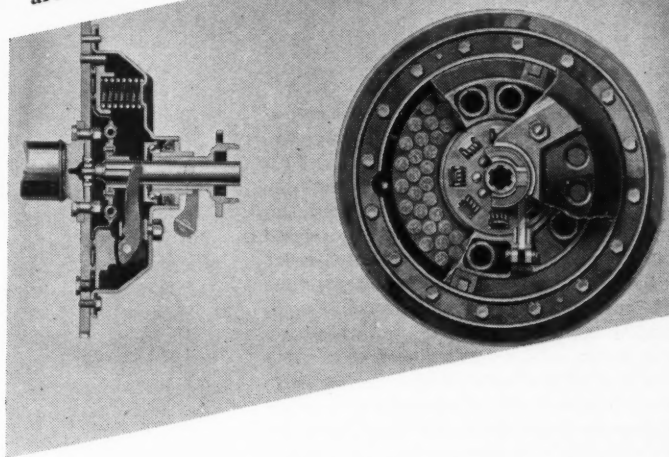
Battery is Willard with 105 amp.  
(Continued on page 72)



# HUDSON



(Above) The Hudson Six cylinder sedan on the 122 in. wheelbase. Other models have similar lines  
(Below) Clutches on Hudson models have been enlarged and three additional springs nested in the regular springs. Disks are now cupped and torsion damper springs are stiffer



**H**UDSON MOTOR CAR COMPANY'S 1938 line consists of an eight-cylinder car made in both 122- and 129-in. wheelbase, a six with a 122-in. wheelbase, and the Hudson Terraplane, with a 117-in. wheelbase. These three chassis are fitted with bodies that are 55 in. wide in the front compartment (the same as last year) and have 2 in. additional inside length, this gain in length being due to a redesign of the front compartment. The 2 in. additional length is made use of to increase the rear-compartment leg room.

Improvements have been made in the selective automatic shift transmission, the electro-vacuum unit which has been offered by Hudson as an option for a number of years. For instance, if upon attempting to shift into low-forward or reverse gear, the gears should butt, the selector lever will automatically return to neutral, thus calling the attention of the driver to the fact that the gear has not been engaged. Another improvement is in the design of the clutch-operated circuit breaker, whose function it is to assure that the shift takes place only when the clutch is disengaged. The automatic clutch action which takes place in connection with the gear shift, has been improved by the provision of a balanced vacuum cylinder. This is said to make it possible to creep backward or forward,

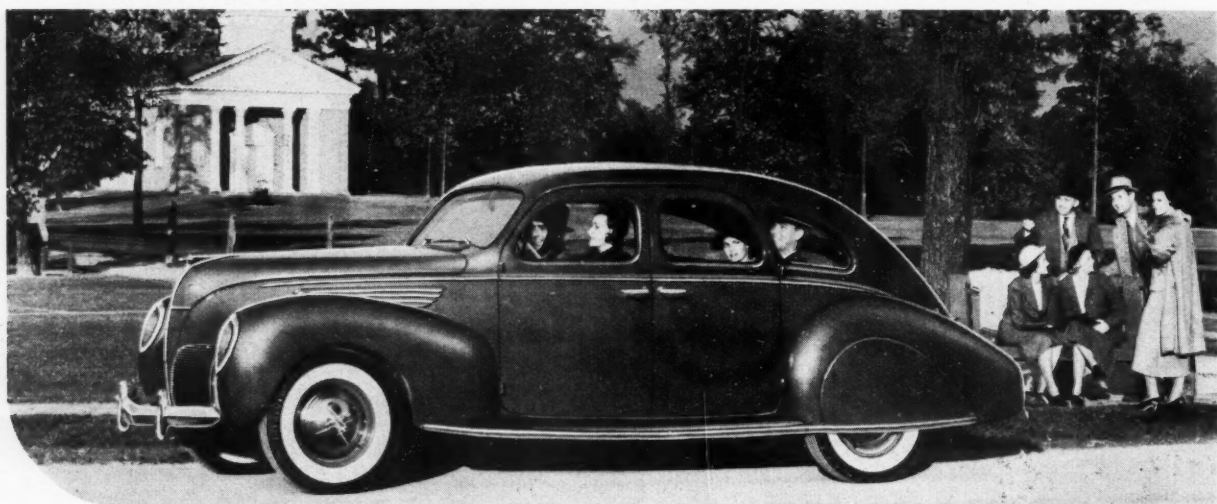
as required when maneuvering into relatively narrow parking spaces. Formerly a pendulum device was used for this purpose, but this has now been replaced by the vacuum cylinder. As previously the free-wheeling action of the automatic clutch is eliminated at speeds above 18-20 m.p.h.

On the Hudson Terraplane deluxe model a single-throat, manual-choke carburetor is used. The metering of this carburetor is controlled by a metering pin which was formerly connected to the accelerator pedal, while now the position of the pin is controlled by the manifold vacuum. This is said to assure more accurate metering and to make it possible to run on leaner mixtures, thus making for better economy. All other Hudson

models carry dual-throat carburetors, and in these an improvement in the automatic choke is said to have made stalling impossible.

The Hudson eight-cylinder engine (3-in. bore, 4½-in. stroke, 254-cu. in. displacement) operates with a compression ratio of 6.25 and is rated 122 hp. at 4200 r.p.m. The six-cylinder engine (3-in. bore, 5-in. stroke, 212-cu. in. displacement) as installed in the Hudson Six, has a compression ratio of 6.25 and is rated 101 hp. at 4000 r.p.m. When provided with a special cylinder head with a compression ratio of 7, the rating is 107 hp. As installed on the Hudson-Terraplane, with single-throat carburetor, the rating is 96 hp. at 3900 r.p.m.

(Continued on page 70)



# LINCOLN-ZEPHYR

**T**HE most outstanding features of the Lincoln-Zephyr for 1938 are longer wheelbase, completely new front end styling, new rear fenders, and a combination of mechanical improvements which provides increased body room, especially for the driver and front seat passengers. A number of engine refinements contribute to added smoothness and quietness of operation. An innovation is the introduction of convertible models embodying features of frame construction differing from the truss-type body design used previously in all closed bodies and continued for the 1938 closed types.

The front end design is a departure from conventional practice in that the entire forward end is enclosed, except for two rectangular openings near the bottom for the admission of air to the radiator.

The wheelbase has been increased from 122 to 125 inches. Part of this increase has been allocated to the length of the hood, and part to increasing the length of the body at the dash. The engine has been moved forward as well, increasing the available leg room for front seat passengers and reducing the height of the floor tunnel in both front and rear compartments. Contributing to the latter is a redesigned transmission which has the shifting mechanism on the right side instead of the top. The front com-

partment floor is completely free of all operating levers, since the gear-shift lever now is carried upward ahead of the instrument panel, where it then comes through the left side of the "Y" extension, and thence backward to a convenient position. The brake lever is located to the left of the steering column under the edge of the instrument panel as formerly.

The tunnel in the rear compartment has been reduced by the adoption of hypoid gears for the rear axle. Straddle-mounting of the driving pinion has been discontinued.

Consistent demand for "open" type bodies has resulted in the introduction of two types, a convertible coupe and a convertible sedan. Since there are

no overhead steel members in the body structure it cannot be depended upon to supply necessary strength. A chassis frame performing the conventional function, but of essentially different design is employed for these types. However, the body units are welded to the chassis frame, thus increasing the rigidity of the entire assembly.

The frames for the convertibles consist of main side-members of double box section, formed by placing one channel within another, then welding a plate onto the edges of the upper and lower flanges. In addition, an X-member of similar construction is employed.

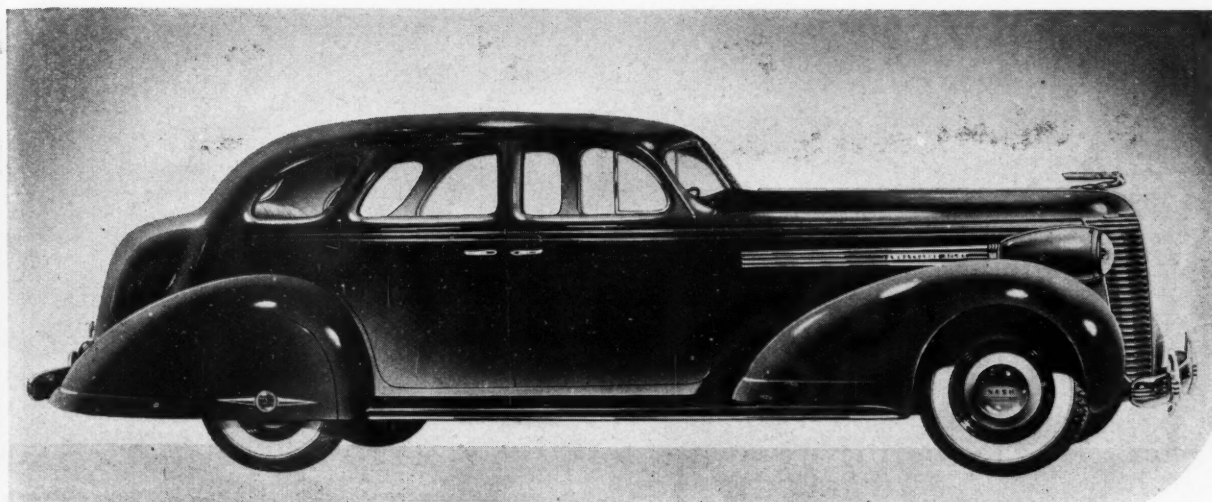
Several improvements in the engine  
(Continued on page 89)



Six body types are offered on the Lincoln-Zephyr chassis for 1938. Wheelbase has been increased to 125 in. and hypoid reduction gears have been adopted.

The conventional grille in front of the radiator (above) has been eliminated in favor of two openings near the bottom.





(Top) Appearance of this Nash Ambassador eight on 125 in. wheelbase is typical of the Nash line for the coming year.

The "Air conditioning" unit purifies, warms and circulates the air in the car.

# NASH

is in the air if wet weather prevails outside.

When the system is in operation, air is forced in through the cowl ventilator at a rate dependent upon car speed, but also controllable through adjustment of the ventilator.

After the moisture, if any, has been "spun" out and carried off through a special vent pipe, the air is introduced into the conditioning unit through the filter, which cleans it. From the filter, the air travels past the motor-driven fan, through the hot water heating element and out into the interior of the car.

Chilling drafts are said to be eliminated because the system builds up within the car an air pressure greater than that outside, but a pressure that is not noticeable as far as occupants of the car are concerned.

Of equal importance is what Nash calls the "Super Thrift" engines which utilize the same principles of design as the "Monitor-Sealed" engine. It will be recalled that the main feature of the design is that only two main castings—the cylinder block and the head—are required and many minor parts have been eliminated by enclosing both the inlet and exhaust manifolds within the engine.

With this system, the inlet manifold, being located inside the cylinder block on the LaFayette series and inside the

(Continued on page 70)

THREE series of new Nash cars will be presented during the new automobile year by the Nash Motors Division of Nash-Kelvinator Corporation.

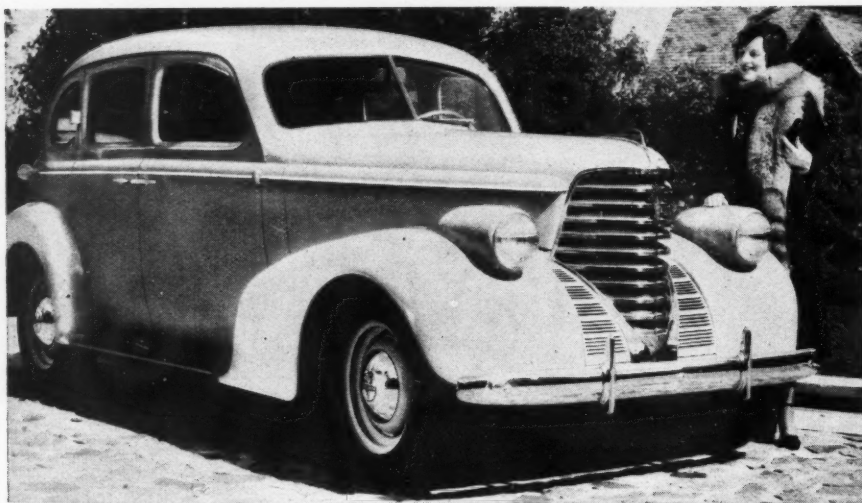
Topping the list of major developments is the conditioned air system for winter driving which Nash recently announced. Prominent also among the outstanding features are new type engines which utilize Nash's "monitor-sealed" principle.

Among the important advances also are a new shock absorber arrangement that enhances riding quality, a vacuum-operated gear-shift, actuated by a small lever extending from the center of the instrument panel; a new sound-proofing method; and a more

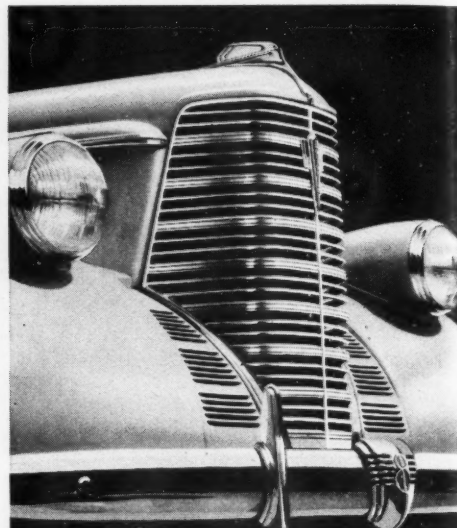
spacious and luxurious interior.

The company's announcement describes the conditioned air system for winter driving as one that brings into the car copious quantities of cleaned, warmed air, circulates it, ends drafts, eliminates window and windshield-steaming.

The system consists of a unit containing an air filter, a motor-driven fan and a hot water heating element. This assembly is mounted under the cowl and is connected with the cowl ventilator by means of a "stack" arrangement which is completely out of sight. Within the "stack" is a chamber in which the air is "spun" by its own pressure. This action removes the greater part of the moisture that



(Above) New fenders, head light and radiator grille improve the appearance of the Olds six



(Upper Right) Front view of the 1938 Olds eight

(Right) The automatic transmission is operated by a short lever mounted below the steering wheel.



# OLDSMOBILE

By JOSEPH GESCHELIN

OLDSMOBILE enters the 1938 season with radical changes in front end styling and front end sheet metal arrangement, although the body shell remains the same. Because of the unusually fine service record made during the '37 season, both the Six and Eight chassis units are continued without significant mechanical change.

Front end treatment which may be best appreciated from the illustrations, follows the characteristic pattern of last season with horizontal radiator grille treatment that attracted so much attention last year.

Most important mechanical feature so far as the car owner is concerned is the safety automatic transmission announced this fall which will be offered as an optional factory installation on both the Six and Eight. The installation is greatly improved by the use of a new steering wheel carrying a small, transparent molded plastic

sector etched with letters indicating gear position. This makes a very neat job and eliminates the rather cumbersome sector mechanism used at first.

The hood has been improved and incorporates a shrouded and concealed louver. Hood and hood side, on each side, are in one piece hinged at the center so as to freely expose the entire engine. Sheet metal filler plates are arranged to be quickly detachable at the frame to make possible free access to the valve mechanism for service operations without removing the front fender.

Lamps now are fender mounted and braced securely by means of a cross-member extending through the front sheet metal assembly. Lenses have been increased in diameter from 6½ to 7 in.

An example of the first significant improvement in battery installation is found on these cars. The battery is the

new Delco end-to-end cell arrangement and is mounted in a completely sealed metal battery box on the hood ledge in the engine compartment. The sealed cover is readily removable for service operations. The battery box is thoroughly ventilated and cooled by a force feed device in which air is taken through a duct from the front apron louvers and vented at the rear through a large hole in the wall of the box.

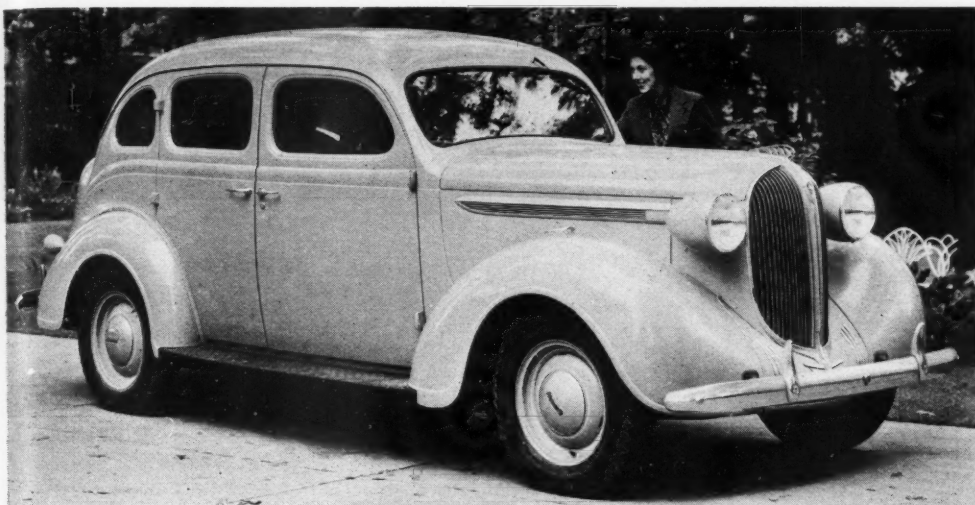
Both the Six and Eight use the large front apron louvers for supplying fresh outside air to the air duct and also for the battery.

Defroster outlets now are extremely wide slots punched in the windshield garnish molding, permitting the heated air stream to impinge directly on the glass. Heated air is supplied by a large deluxe heater with oversize blower for the defrosters.

Engines remain unchanged. Due to the specific demand of the automatic transmission, the carburetor for the Eight has been fitted with a special vacuum-operated fuel nozzle which aids in producing a richer mixture in the interval during gear changes where engine speed tends to drop

(Continued on page 72)





Deeper fenders, curving around to a new steel apron across the front, mark one of the changes in the new Plymouth

# PLYMOUTH

**K**EEPING all of Plymouth's fundamental major features, engineers have added many new features including easier steering, faster handling, safer vision and better sound-proofing.

Overall length is 194 in. on all models from bumper to bumper. The complete Plymouth line for 1938 includes three "Business" and eight "Deluxe" body types, all on 112-in. wheelbase with L-head engine of 82 hp.

Grille design remains simple, with vertical chrome bars each side of a solid center strip painted same color as the body. But the outward flare at the top of last year's center strip now disappears, restoring straight center lines all the way to the top of the grille, which again is a severely plain arch across the upper half.

The sweeping hood, with teardrop headlamps on wind-stream supports, gives the car a sleeker look. The new apron gives it foundation, setting the stage for the bolder front profile.

Hood louvers continue the flowing line of the windstream supports for headlamps. To make the hood fit snugger and sleeker, Plymouth introduces a new hood design with fixed side panels, and only the top sections swinging open for routine service.

The windshield is larger with 12 per cent greater visibility in the vertical plane and increasing safety by making it easier to see traffic lights, as

well as closer down in front of the car.

A new front seat mechanism automatically adjusts the eye-level of drivers of any height. The front seat now moves higher as it comes forward with a spring assisting the forward motion and an anti-cocking device to prevent the seat from getting stuck in any position.

Useful space in all luggage compartments and built-in trunks has been greatly increased by removing the spare tire and wheel from the floor, and mounting it flat against the inside panel. A new fabric lining dresses up the luggage space, and affords added protection to baggage.

The clutch pedal works still easier, with pressure reduced about 15 per cent. The clutch itself has a new baffle plate to keep out oil and water vapor; a new and improved driven disk with two woven facings; and a new release bearing spring, with increased grease capacity. These all add up to longer clutch life, easier servicing, new ease and smoothness of operation.

Also, a new pistol-grip type of hand-brake is used. Located up under the cowl and back of the instrument panel below the center of the board, the pistol-grip handle connects with a separate brake band on the drive shaft, through a flexible cable.

Plymouth retains a 17-in. steering wheel, but steering gear ratio is re-

duced from 16.4 to 14.6, and the pitman arm comes down to 7 in. This combination gives an over-all steering ratio of 17.6 to 1. That means 5 per cent faster steering than last year—which ordinarily should make the steering wheel harder to turn. As a further aid to steering ease, roller bearings are used at the upper end of the king pin.

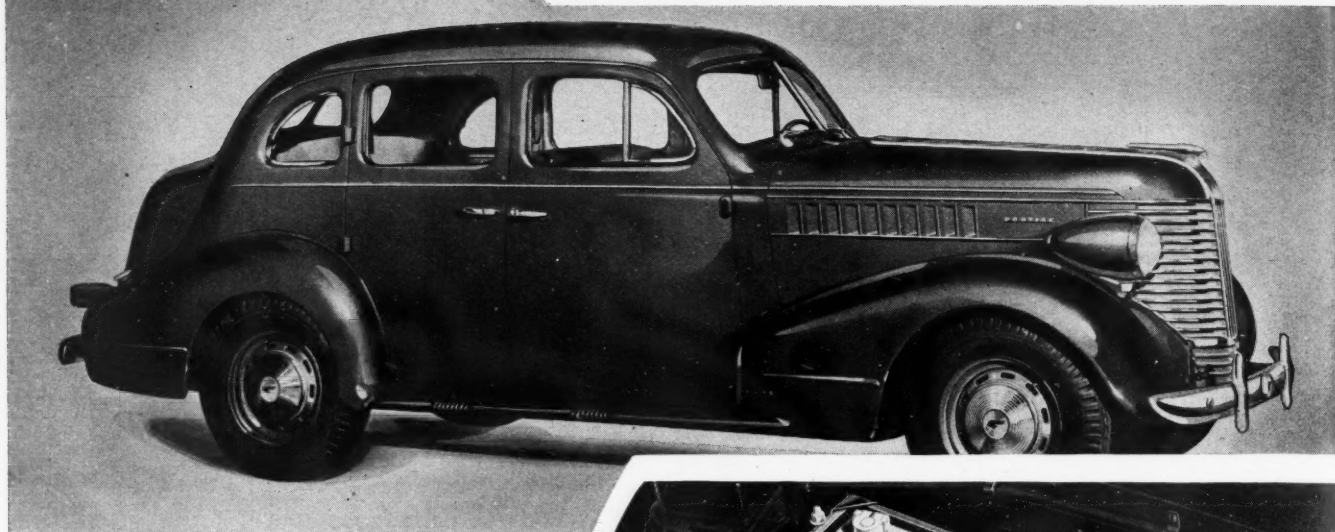
The new generator has a peak charge rate as high as 30 amperes. An improved ventilating fan on the new generator makes the higher charging rate perfectly safe, without shortening the life of the unit.

Five different kinds of insulating materials, besides rubber, block out noise and heat from the Plymouth body. In one place these are a full inch thick, like the jute and fiber board inside the dash panel to keep out engine noise and fumes. Other types are a wool blanket used in the roof, underneath the cowl and at "bald heads"—the curving walls behind the back seat; a mastic mat on the floor pan, asphalt-impregnated felt on the toe and floor boards; and a liquid, asbestos-and-asphalt, sprayed on and baked inside the door panels and under deck lids.

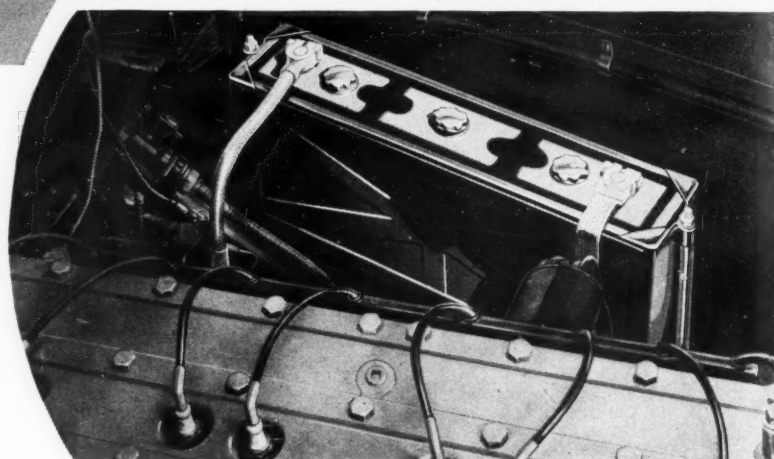
The aero-hydraulic shock absorbers are direct-acting, "telescope" design, and operate in a cushion of oil four to five times greater than the amount

(Continued on page 59)

# PONTIAC



Note the new frontal appearance of the Pontiac Six, the eight is similar  
(Right) Batteries are carried under the hood



**E**NTERING the 1938 season with further refinement of the brilliant silver streak styling, Pontiac offers many detail changes and improvements in hardware, body interiors, and major units. Basically, the body and chassis continue the same features that were so eminently satisfactory last year.

Hood sides normally are fixed but may be readily removed for service operations. Wheelbase remains the same—117 in. on the Six, and 122 in. on the Eight.

Safety features are strongly emphasized, and comprise the following items—safety instrument board with rolled edge and recessed control knobs; safety roll on front seat back; safety robe cord, and flat window control knobs.

The most interesting of the mechanical features is the safety-shift gear shift which is optional equipment at very low added cost on the new cars. It is a unique remote control of gear shifting by means of a hand lever mounted on the steering column under the wheel. While the operation of the new remote control requires no new driver habits, its operating mechanism

is of interest. The chief difference between this control and the conventional shift lever is that the cross-over action is up-and-down instead of cross-wise. The control lever is mounted in a small pressed steel housing and communicates with a hollow rod running outside the steering column. The lever terminates in a spring-loaded ball end which permits a slight up-and-down movement of the rod which is translated into a push-and-pull action through a flexible cable connected to the end of the rod.

For gear shifting, there is a ball and socket drag link running from the lower end of the control rod over to a lever mounted on the gear box cover. Thus there is a flexible cable for cross-over and a direct mechanical link for shifting.

Engines remain basically unchanged, retaining the same bore and stroke. The double-row ball bearing water pump which was placed in pro-

duction during the '37 production season is continued with a minor change—locking the composition thrust washer by means of two ears. Pontiac continues the chrome-nickel alloy pistons with a slight change on the Six consisting of a rib to support the head. The design of the Eight with its smaller diameter piston remains the same.

An auxiliary economizer nozzle control has been added to the carburetor to eliminate the flat spot on quick acceleration. This operates on manifold depression while the conventional control remains connected to the throttle linkage.

A higher capacity fan with blades in pairs at 76 degrees apart increases cooling capacity and makes for quiet operation. Generator capacity has been upped 30 per cent to better handle the increased accessory load. Batteries are of the new Delco end-to-

*(Continued on page 90)*





#### Cadillac Housing Vents

The axle housing of all 1937 Cadillac cars are provided with vents to maintain atmospheric pressure conditions inside the axle housing under all driving conditions. On series 37-50 and 60 axles the vent consists of a small hole at the top of the housing.

On series 37-65, 70 and 75 and 85 axle housings there are two small vent holes in the bottom of the housing, one on each side of the drain plug, which vent the space between the inner and outer housings.

On 37-90 cars, the vent consists of a vent pipe in the top of the differential housing and has a fitting and pipe extending down the side for the same purpose.

These holes should always be kept open: They should in fact be checked every time the lubricant level is checked. If they should become clogged, the lubricant level will become too high.

#### Studebaker Starter

In the event the starter in a Commander or Studebaker six does not respond when the starter switch on the instrument board is operated, it is possible that a poor ground connection between the switch and the back of the instrument panel is the cause of the difficulty. Such a condition can be quickly corrected by rotating the switch to the left or the right to provide a definite connection between the retaining lugs on the switch and the metal of the panel. A small amount of movement of the switch ordinarily will place the lugs on a high spot on the panel, as indicated by resistance to turning and provide the proper ground connection.

## Service Hints

### From the Factories

#### Voltage Regulators

In checking over a few 1937 President voltage regulators which were returned to the claim division because of defective operation, the engineering department of the Studebaker Corp. has found that in practically all cases the only difficulty was that of burned cut-out relay points. Investigation of this condition definitely indicates that this condition will occur if, when the regulator wiring connections are installed, the ground wire is not installed before the other wires. Where the ground wire is not installed first, the polarity of the generator is reversed and the generator will not charge; furthermore, the cut-out relay will vibrate an arc causing rapid burning of the points.

The polarity of the generator can be reversed by momentarily connecting a jumper between the generator and the battery terminals of the regulator. However, unless this condition is caught immediately the points will burn to a point where they may stick and cause discharge of the battery.

#### Chrysler and De Soto Oil Pans

Difficulty in removing the oil pan from 1937 Chrysler and DeSoto cars can be eliminated by first turning the engine so that No. 1 piston is half way up the cylinder bore. Then use a long handled speed wrench with a universal joint  $\frac{1}{2}$  in. socket.

#### Buick Hood Alignment

Four adjustments are provided to align the hood on 1937 Buick cars. Spacing washers can be added or removed from between the radiator cross rod and clamps can be shifted. The grille can be raised or lowered to meet the hood by loosening the grille mounting screws. The radiator can be shifted by loosening the bolts at the fender irons and the radiator at the front cross member. The extent of this shifting is limited by the clearance in the front fender iron holes. The strut rods can be lengthened or shortened. If these rods are used to push or pull the radiator assembly, forcibly, it is likely to result in distorting the radiator shell assembly and cause a type of misalignment which cannot be corrected by adjustment.

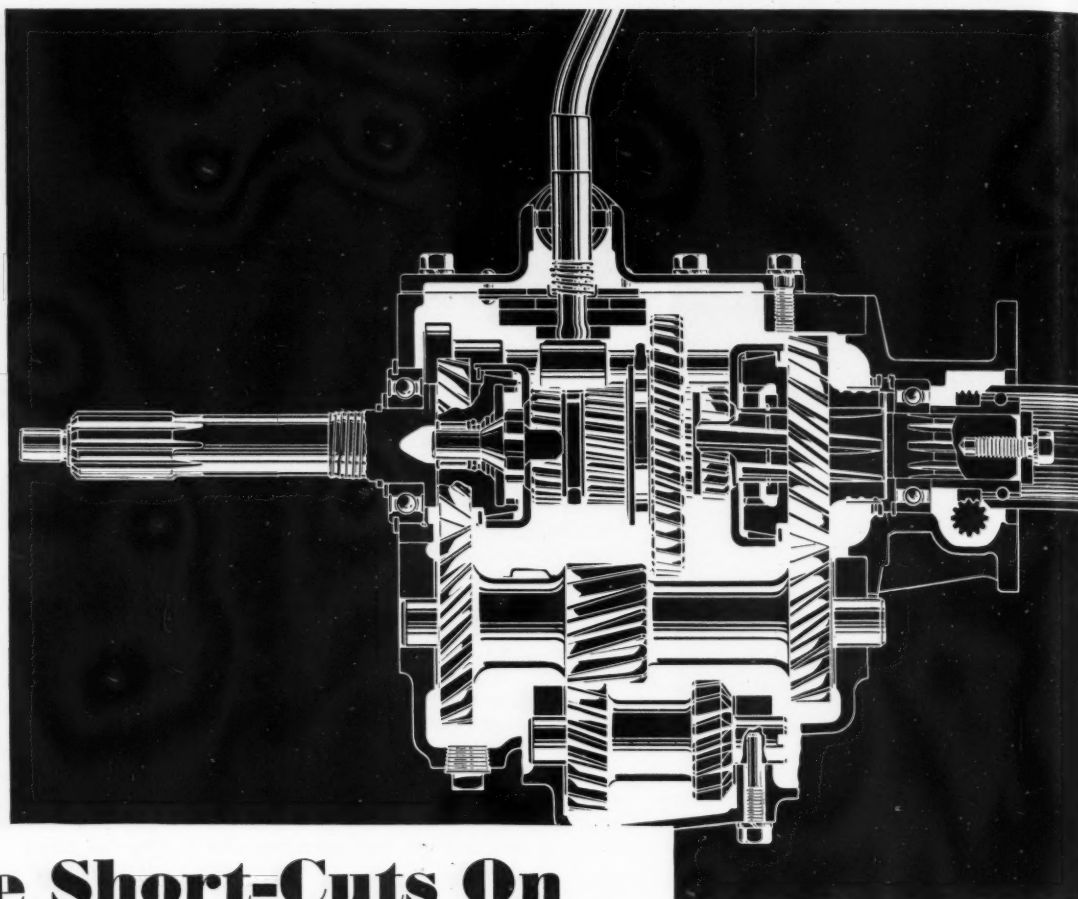
#### Speedometers

There are usually two contributing causes for noisy speedometers on 1937 Chevrolet cars and trucks. Noise will result when the lower cable tip is not seated properly in the speedometer drive gear or when sharp bends or kinks are present in the flexible shaft. In some cases the hole in the speedometer driven gear may be too small to permit the cable tip to enter properly. A fine file should be used to break the square corners on the cable lower tip just enough to permit the tip to enter the hole in the driven gear properly. If it is found that the hole is too shallow to permit the tip to enter at least one inch, the driven gear should be replaced.

Sharp bends and kinks may be relieved in the speedometer cable through adjustment at the cable clips. Greasing the cable is not a remedy for noise. The speedometer flexible cables are lubricated before installation and only in extreme cases should it be necessary to lubricate them in service. When lubricating cables, a light coat of grease should be applied to the lower third of the cable. When assembling the cable in the case, the upper two-thirds will receive its lubricant. Too much grease on the cable will result in it being forced up into the speedometer, thereby rendering it inoperative. The speedometer requires a special grease known as Special AC Speedometer Cable Grease.



"I got it at an auto supply store—it's a fender splash-guard!"



## Service Short-Cuts On PONTIAC TRANSMISSION

**W**HILE there are no particular difficulties encountered in servicing the transmission on the 1937 Pontiac cars, it is essential that every repairman know the overhaul procedure.

As in all modern transmissions, when the gears fail to synchronize properly the clutch should first be checked to make sure that it is

working properly. In addition, improper lubrication will cause poor synchronization. So, in any case, it is advisable to flush and clean the transmission thoroughly and examine all parts for freedom of operation. The main drive gear should turn freely when the main shaft is held. Also, the sliding sleeve should be free on the splined main shaft.

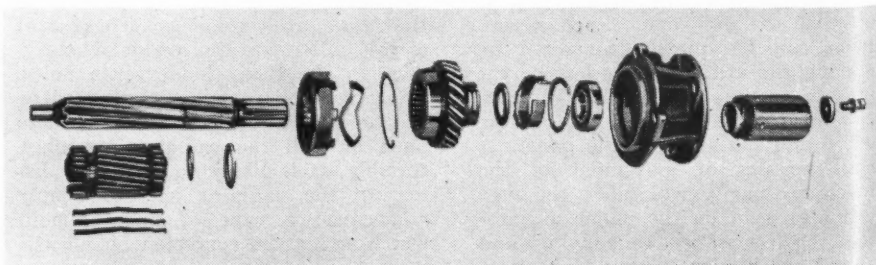
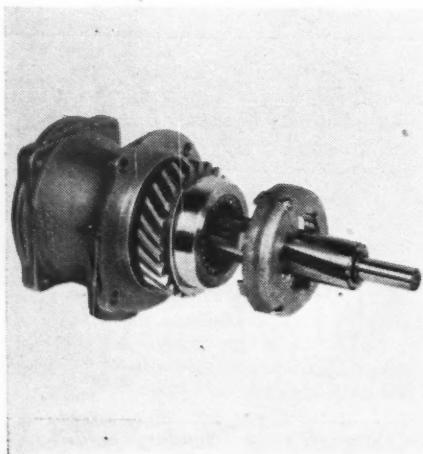
If the cause for improper synchronization is not apparent from such an inspection, it will then be necessary to dismantle the trans-

mission for a closer examination.

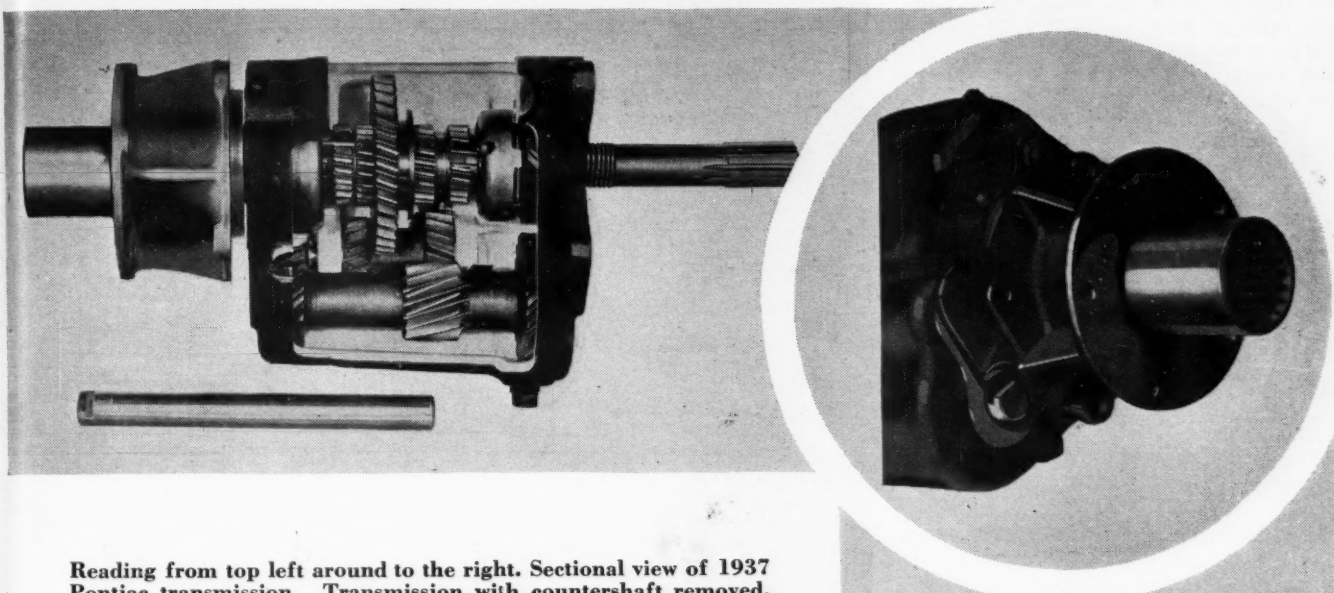
The procedure is as follows: Remove front floor mat, floor center panel and front seat assembly. Disconnect speedometer cable at the transmission and rear universal joint. Then, remove front propeller shaft housing to transmission cap screws.

Remove engine rear support bolts and jack up rear of engine to allow transmission play to clear the frame cross member.

After removing the transmission fastening bolts, pull the transmission backward until main drive







Reading from top left around to the right. Sectional view of 1937 Pontiac transmission. Transmission with countershaft removed. Counter gear shaft unlocked. Removing main drive gear. Removing rear bearing retainer assembly. Sliding sleeve removal. Main drive gear disassembled. Main drive shaft and rear bearing retainer disassembled. Removing synchronizing drum.

gear is free. Then, pull forward and upward at the front to remove the transmission and coupling from front propeller shaft and housing.

The transmission can then be removed through the floor opening.

To disassemble, remove the transmission cover, interlock plate and shift bar which will permit the removal of the shifter shafts and forks.

Next, take out the cap screws securing the rear bearing retainer and turn the retainer clockwise to unlock the counter gear shaft.

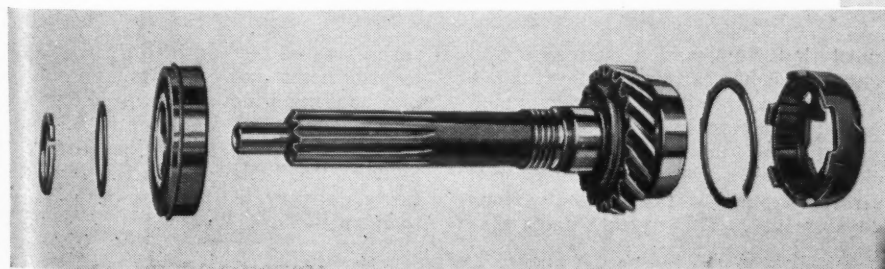
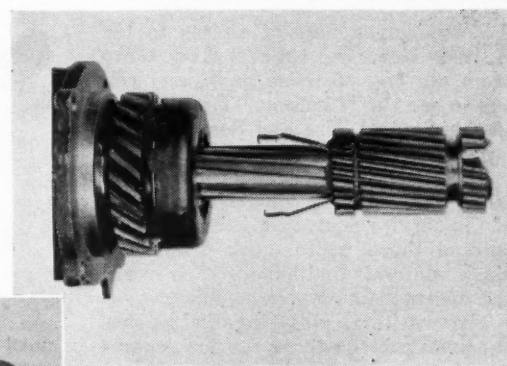
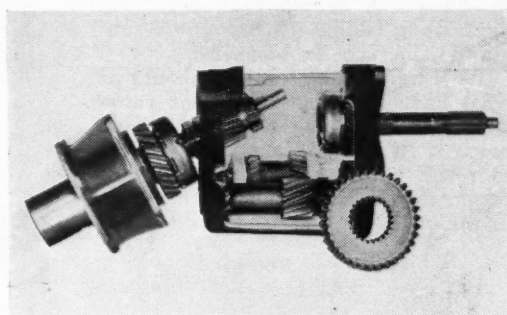
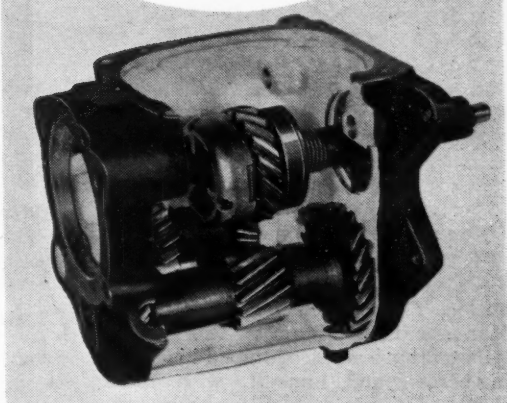
Drive counter gear shaft through the rear of the transmission to allow the counter gear cluster to drop to the bottom of the case. Fig 2.

To disassemble second speed gear, remove the sliding sleeve and the flat springs from the splined shaft. Fig. 6. Remove the synchronizing drum snap ring and slide the drum off the end of the shaft. Fig. 9. Press the splined shaft out of the

front propeller shaft coupling and speedometer gear assembly. The rear bearing and second speed gear may now be removed from the rear end of the splined shaft.

The next step is the disassembly of the main drive gear assembly. First remove the snap ring from high speed synchronizing drum. Remove front bearing retainer and spring washer. Bearing can then be removed by bumping the shaft on a block of wood. When replacing the ball bearing be sure that the shielded side of the bearing is toward the gear and use a tube over the shaft to press bearing in place.

Assembly is accomplished in the reverse order.





#### And The Customers Roll In

**A**N Indianapolis service station steps to the fore this month with an idea for providing speedier service. Manager Clay Mogg of this station tells us that he has equipped his working crew, and himself, with roller skates for rapid travel around the driveway. A simple idea, yet Manager Mogg claims it's brought a substantial increase in business.

We'll agree that the idea should at least have some entertainment value when an over-eager service man sprawls on his -er- face in his efforts to reach a car. However, we don't recommend it for stations with gravel drives.

#### Time Clocks For Customers

**I**F you buy a pair of skates to try that idea, we suggest you strap them on, one of these days, and roll out to see the "Customer Time Clock" at the Central Tire and Service Company, Seattle's largest service garage.

Their "Customer Time Clock" is a large panel plainly visible at one end of the service floor. On this panel are painted three white clock dials with black numerals and hands. The hands are operated manually.

The washing, polishing and greasing units are the three service departments represented by the so-called clocks, and the time on each dial indicates the time up to which the particular department is tied up with orders. If the hands on the washing department dial point to three o'clock, it means that the wash unit has jobs

# SELLING SERVICE

**By BERT POLLOCK**

until that time, and a customer who must have his car washed by 2:30 is not given a promise of delivery which is impossible to keep.

The floor manager operates the clocks through information telephoned directly from the heads of the various departments. This system helps ma-

terially to oil the routine on rush days or peak hours and prevents floor salesmen making promiscuous promises as to delivery time. Manager F. B. Taylor thinks it's valuable because, as he says, "A 'little leak' in the form of tardy delivery is the best way NOT to keep business."





An attractive example of good lighting without glare

dash showing a small red light. Take the outer cover off, solder a pair of wires to it, with a pair of clips on the other end, and you have a miniature light that will work from the car battery and will go into a hole so small that it will amaze you."

We'll let Mr. Howse consider us just as amazed as his customers must be when he pulls out a spark plug, inserts the light into the bore, shows the customer how much carbon he's been lugging around on top of the piston and winds up by selling a much needed carbon and valve job. Just another example of a small idea that means dollars in extra profits.

Mr. Howse has found the little light also valuable for peeking into gas tanks—not using, of course, the car's battery for fear of sparks. It's been handy, too, used in combination with a small mirror, to enable him to see around lots of odd corners in his customers' cars.

### Lights Attract Them

**S**PEAKING of time, how does your station look at night time? Jack Sheppard, Tampa, Florida, garage man and service station operator made sure that his station was making a strong bid for after dark business by installing sodium lighting.

Yes, the same sodium lighting that has recently been publicized so much in the moves toward safer lighting of night accident zones along main highways. Jack Sheppard claims its installation at his garage is the first of its kind, for such a purpose, in the southeast section of the country.

In addition to being pleased by its glareless orange-yellow light, Mr. Sheppard is also pleased with the 25 per cent increase in night sales this sodium installation has brought to his location.

### Good Lighting—Good Business

**W**HILE we're on the subject of night illumination, we'd like to call your attention to the accompanying photograph of the General Electric gas-pump island luminaire. Ordinarily, we don't plug products on this page, but since we were unable to obtain a good picture of Jack Sheppard's set-up, we thought we'd show you this as an example of attractive lighting.

The luminaire, in case you want to know, has a totally enclosed reflector which helps in retaining reflective brilliance. The light is diffused through a rippled-glass globe, which eliminates spotty lighting.

### Brightens Location

**W**E don't know how Messrs. Tracy and Tenney, of Schenectady, N. Y., light their location at night, but we do know how they brighten it by day.

These two smart merchandisers realized that they'd have to do something out of the ordinary if they were to get ahead of the keen competition in that city. So they hired two pretty and intelligent girls, tricked them out in jodhpurs and jaunty caps, and set them to work handling the regular service station part of their business.

Results have far exceeded expectations. The girls like the work and are quite successful in selling tanks of gas, lubrication jobs and oil changes.

The girls work eight hours daily, alternating early and late shifts, and motorists come from far and near to be served by Schenectady's only girl "salesmen." Of course, men mechanics are always nearby to lend a hand with tire changes and other heavy work.

We think it's a grand idea for, impervious to feminine allure as we claim to be, we know we couldn't say no to either of these super-servicers.

### More Light

**F**ROM Shreveport, La., comes our next item. Mr. N. Howse, who keeps cars motor happy in his Lexington Avenue garage, writes in and tells us to—"Get a small pilot light and socket from your supply house; one of the kind that mount on the

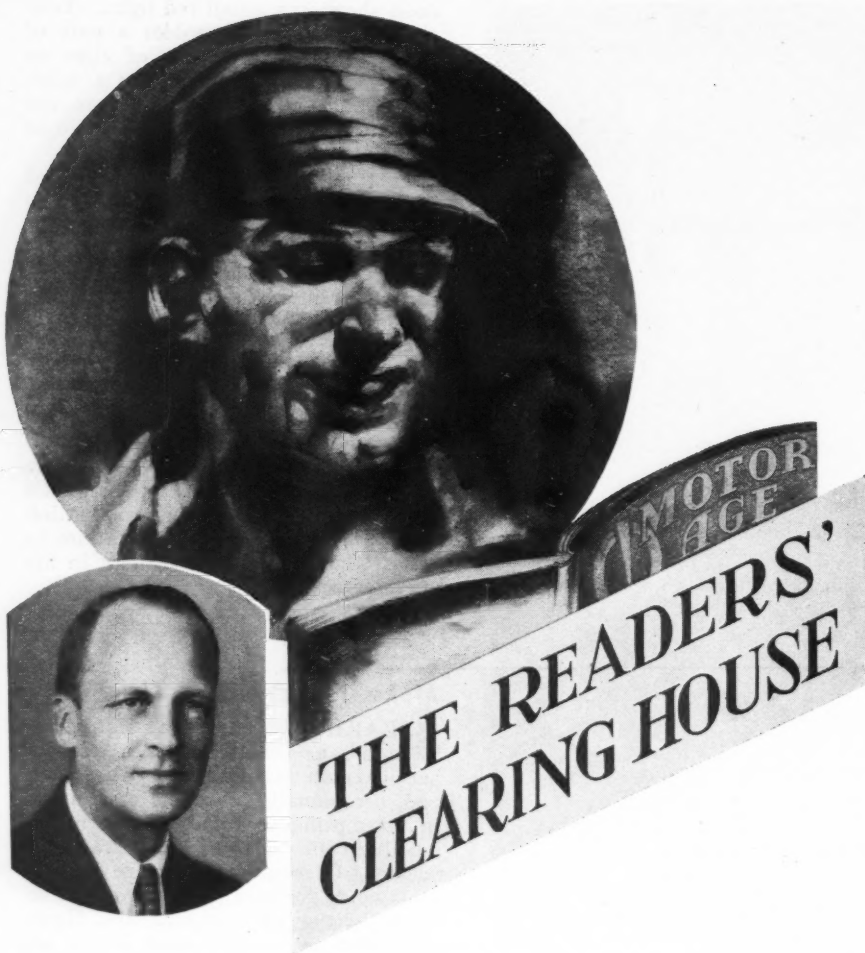
### Make It Easier Next Time

**S**PEAKING of lights and things reminds us that we've seen many a service man ruin a good disposition and, occasionally, a couple of thumbs in attempting to remove a worn out headlight or taillight bulb from its socket. Of course, there are special tools made for this purpose and we've no doubt they're very effective. However, this is another case where an ounce of prevention is worth the loss of a dollar's worth of time and temper in selling a twenty-cent item.

The ounce of prevention is merely placing a drop of colloidal graphite in the lamp socket before putting in a new bulb. The graphite prevents corrosion and you'll find the bulb just as easy to remove as it was to install—no matter how long it stays in.

If you decide to try this, by all means show and tell your customer what you are doing. This is an example of how showmanship can help in your business. Play it up and the customer will appreciate your interest in his car just as much as you will appreciate his returning to your service department when he needs a replacement.

**T**HESE are practical merchandising ideas that have been used by maintenance men — just like yourself. Workable ideas gathered from here, there and everywhere and presented for practical application to your business. Use them and write us your experience for publication herein.



**BILL TOBOLDT, Editor of MOTOR AGE, conducts the Readers' Clearing House. He presents some of the thousands of questions asked by readers of Motor Age together with a practical analysis of the difficulties in his replies. You, too, are cordially invited to send us your problems.**

## OIL LEAKS

We have been having a flock of trouble with two 1933 Chevrolets with oil leaks around the crankshaft. Tore both jobs down and checked main bearing return hole. Installed new oil thrower, timing gear case and gasket in one and tightened the mains on the other one. Oil just started leaking with no work having been done before. Both motors really are not in good shape but the owners won't have them really overhauled. Also, on a Model A with new mains, mains were line reamed and leaks oil through the back main in the flywheel case. Is there any remedy? J. Kincaid, Greenfield Super-Service Station, Greenfield, Ill.

ON your 1933 Chevrolets that are leaking a lot of oil, I assume from your letter that the oil is leaking out of the front end of the crankcase.

If such is the case, I would make a careful check to be sure that the drain from the timing case into the oil pan is clear and not obstructed with a portion of the gasket or other sediment.

In addition, make sure that the oil nozzle, through which oil is delivered to the timing gear, is in position. It sometimes happens that these oil nozzles get loose with the result that too much oil is delivered to the timing gears.

On your Model A, there is a possibility that the paper gasket between the engine block and the flywheel housing has become torn or punctured. As you know, this gasket seals the camshaft rear bearing and when torn, excessive oil will leak out. Such condition looks like a rear main bearing leak.

I understand that you installed new mains in your Model A Ford but what

about the condition of the crankshaft journal? If this is excessively out-of-round, it will be very difficult to seal. There was some change made in the oil drain on this car. This change was made early in 1929 and if your particular car is a 1928 or early 1929, it might be worth while getting one of the new larger size drains. In addition, the clutch cover of the late 1929 cars was provided with ventilating louvers which assisted in reducing rear main bearing leakage. Also, be sure that the oil filler pipe is unobstructed and that the cap has not been forced down too far on the oil filler pipe.

## TRACTOR TROUBLES

I have a Model K Cletrac tractor on which the oiling system will not give over 5 lb. pressure. I have installed a new pump, adjusted all bearings, adjusted oil pressure release valve and installed new oil gage but still have been unable to increase the oil pressure. Other shops have worked on this tractor without any success and the only solution that I can see is to install all new rod bearings. Can you be of any assistance to me? Everett Grimm, R. D. No. 2, Albion, N. Y.

I AGREE with you that about the best thing to do on your Cletrac tractor is to install new connecting rod and main bearings.

To prove to yourself that this is the only thing to do, I would suggest that you make an oil pressure test on this engine and then you will see just how much oil is leaking or being lost at the bearings.

Details of this test are given in the article which I am sending to you, and should you desire any additional information—be sure and call on me.

## MELODIOUS MOTOR

I have a customer who owns a 1936 Graham Supercharger. This car develops a singing noise at low speed—approximately 20 m.p.h.—apparently in the water pump assembly. We have tried different kinds of radiator oils and soap in the radiator without any success.

Could you kindly offer a suggestion as to the noise and how to cure it. This auto has approximately 15,000 miles on it. I have tested for play or wear in pump shaft, there seems to be very little. Jensen Auto Service, 4390 W. 44th Ave., Denver, Colo.

THE singing noise at approximately 20 m.p.h. which you are experiencing on the 1936 Graham supercharged job can easily be overcome by putting approximately one pint, in some cases a little more than a pint, of kerosene into the radiator. This has been tried on quite a few of these cars and has worked out very satisfactorily.



## FORD RACERS

*I would like some dope on the V-8 Fords that were entered in the 1935 500-mile Indianapolis Race. I would like to know what was done to these motors as to valves, cams, oiling system, ignition and whether they used standard Ford heads. I know they were front drive and they used Bosch magneto ignition. I am going to build a V-8 motor for speed and would like to get the dope on these if possible. Can you give me the valve timing and ignition timing that was used? Hugh M. Seeley, Box 65, North Girard, Erie County, Pa.*

**I**N accordance with your request, I am quoting below the information on the Ford V-8 special race cars which were entered in the 1935 Indianapolis race. As the camshafts were of special design, it was impossible to secure the valve timing.

These Ford V-8 specials not only were of the front drive type but also had independent suspension at both front and rear. Two quarter elliptic springs, mounted side by side, were used at each wheel. Springs were enclosed in a streamlined housing which contributed materially to the fine streamlined appearance of these cars.

The front driving element was of Miller design. However, the differential gears were standard Ford production parts and one-half of a standard Ford differential housing was also used. A short shaft extended from the right differential side gear to the outside of the housing where it was attached to a universal joint. The shaft from the left differential side gear passed through the inside of the tubular main transmission shaft to a universal joint on the left side of the case. Short drive shafts extended from these universals to additional



*"Twice a week he comes here to practise."*

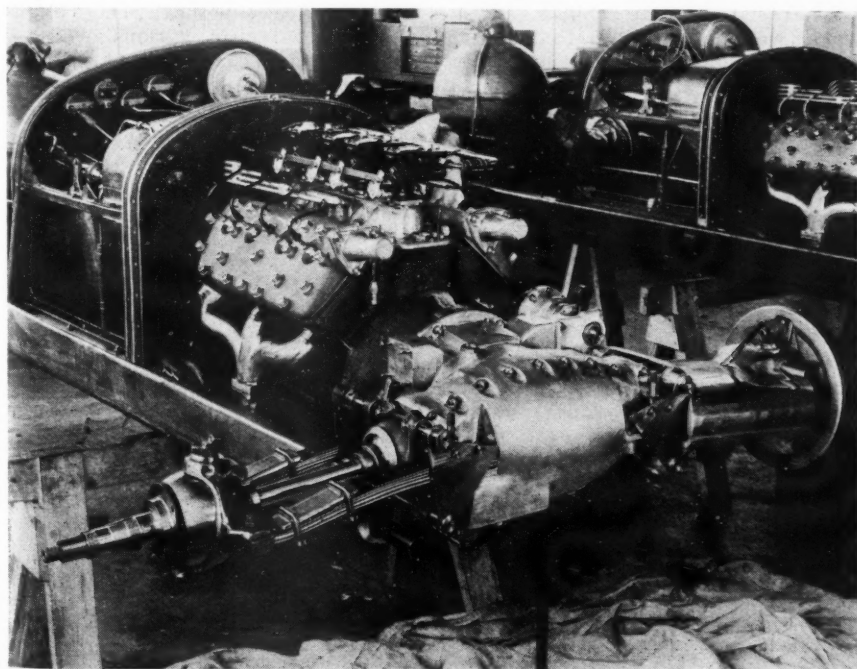
joints at the wheel spindle. These shafts were machined from standard Ford axle shafts. The universal joints at the wheels were of the constant velocity type.

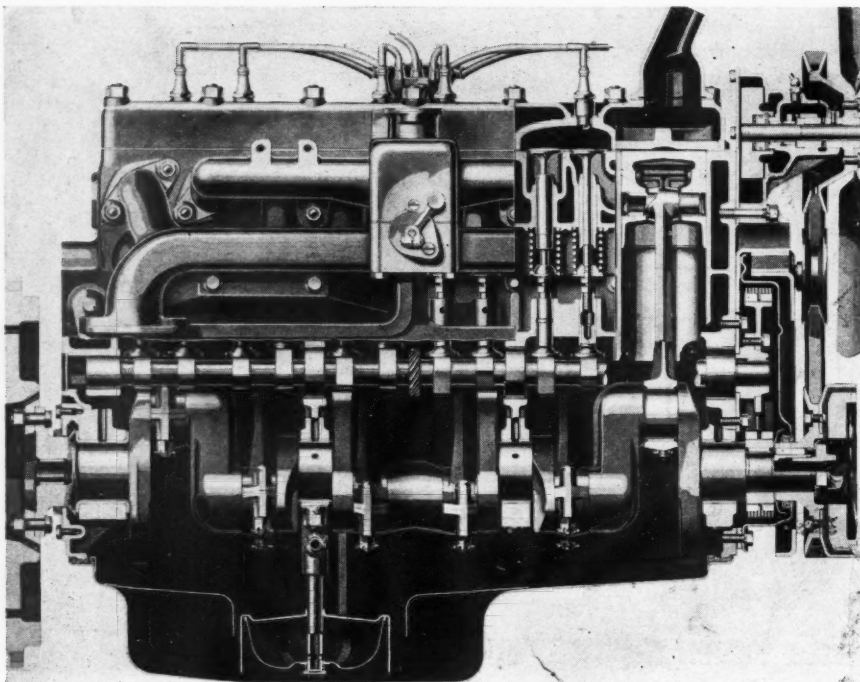
Standard Ford brake assemblies were mounted on the spindles and were actuated by cables. Wheel hubs carried three ball bearings, a large inner bearing and two smaller bearings at the outer ends. The steering unit used in the Fords contained two sets of eccentrically mounted spur type pinions meshed with internal gears machined in the housing. The mounting bracket for this gear was bolted to the front drive housing with

the steering gear arm for the left wheel mounted directly at the end of the steering gear and inside this yoked bracket. A short steering rod extended from the ball on the bottom of this arm to the left wheel knuckle arm. From the upper end of the steering gear arm a tie rod connects with an identical arm similarly mounted on the right side of the front drive housing, with another steering rod connecting to the right knuckle. A small needle bearing type universal joint is interposed between the steering gear and steering wheel to take care of the angularity of the column mounting.

The Ford V-8 driven by Horn was fitted with two duplex Stromberg carburetors, the remaining cars utilized four Stromberg units, all being of the downdraft type. Compression was increased to approximately 9.5 to 1, either through the use of higher pistons or by machining the cylinder head. For ignition, Bosch magnetos were employed; these were driven from the timing gears, the magneto being placed in the driving compartment. Engines were, of course, turned end for end in the chassis because of the front drive.

While camshafts were of special design, they were machined from the standard production units. Crankshafts and rod bearings were standard production units. The oiling system incorporated an oil cooler. A single camshaft driven water pump was employed. The exhaust system was unusual. Flexible metal tubes conducted the exhaust gas from the manifolds on each bank of cylinders to a flat rectangular exhaust pipe under the center of the car. This exhaust pipe was made from corrugated sheet metal and was 12 in. wide, 1½ in. deep and 6 ft. long.





1933 Plymouth Engine

## GETS HOT

One of our customers has a '33-P.C. Plymouth which gets hot intermittently on a long run and sometimes when running for ten minutes idle. Owner maintains trouble started when heater was installed, not from the conventional plug at rear of cylinder head but from two hoses, since which time heater has been removed without improvement.

We have done the following without definite improvement: Removed and boiled out radiator twice, removed and replaced thermostats, checked hose, removed and checked pump, checked ignition and valve timing, removed three plugs from block and cleared out all accessible scale, run several cleaning compounds through block and radiator, cut additional hole in pump baffle plate (between pump and block) allowing pump to force more water through, cleaned carbon, refaced and seated valves, checked head and block and head gasket for crack and seepage.

Water does not rise in radiator from pump pressure excessively; no bubbles come up to surface in radiator. Radiator seems to get hot at top quickly but apparently is clear down all tubes. On a long run when heat occurs owner adds about one gallon of water after which car may or may not give more immediate trouble. J. D. Hargrave, Hargrave Bros., 417 Edgewood Avenue, Atlanta, Ga.

IT certainly seems that you have a hard proposition to overcome on the overheating of that 1933 PC Plymouth, as you have done practically everything that would help the situation. The only thing that I can sug-

gest that might be causing your trouble would be that after you cleaned the radiator the pump forced a lot of scale from the cylinder block into the radiator, again clogging it.

I would suggest that you disconnect the radiator from the engine at top and bottom and then fill the engine water jacket with a very strong solution of soda or some of the special chemicals designed to remove scale. I would suggest that you repeat this several times and each time heating the solution so that you will get the strongest action possible. Then, after you are fairly sure that the block is clean, I would go after the radiator once more and if the passages are straight through, such as in the case of the Harrison or the tubular radiators, I would make sure that it is clean by forcing through some thin strips of steel. Of course to do this it is necessary to first remove the top tank. Reverse flushing of the radiator, with the radiator disconnected from the engine, might also prove to be of assistance.

## BLADE ADJUSTMENT

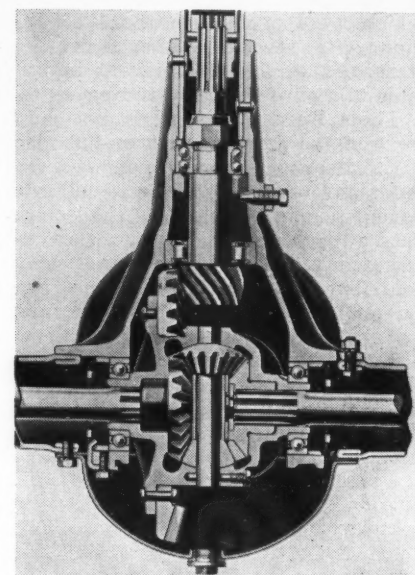
Will you please give me what information you can about a carburetor on a 1931 LaSalle 345. I have your Chilton Flat Rate but cannot find anything in it on this. I am particular about adjustment on what is called the blade. Cliff Oppel, 128 N. 2nd Ave., E., Duluth, Minn.

I AM sending you a tracing of the 1931 LaSalle carburetor which I have taken directly from the Cadillac

Factory Shop Manual. This tracing will show you all of the adjustments on this carburetor and will also give you the amount of free movement of the auxiliary air valve.

## REAR AXLE END PLAY

I have a Chevrolet 1936 and a Pontiac 1936 which have rear axle end-play and I am wondering whether you could give me any suggestions as to stopping this trouble. They make a terrible bumping noise. On the Chevrolet, both axles have about the same amount of play but on the Pontiac, the right axle is the only one which makes a noise. Hammond's Garage, Charlton Depot, Mass.



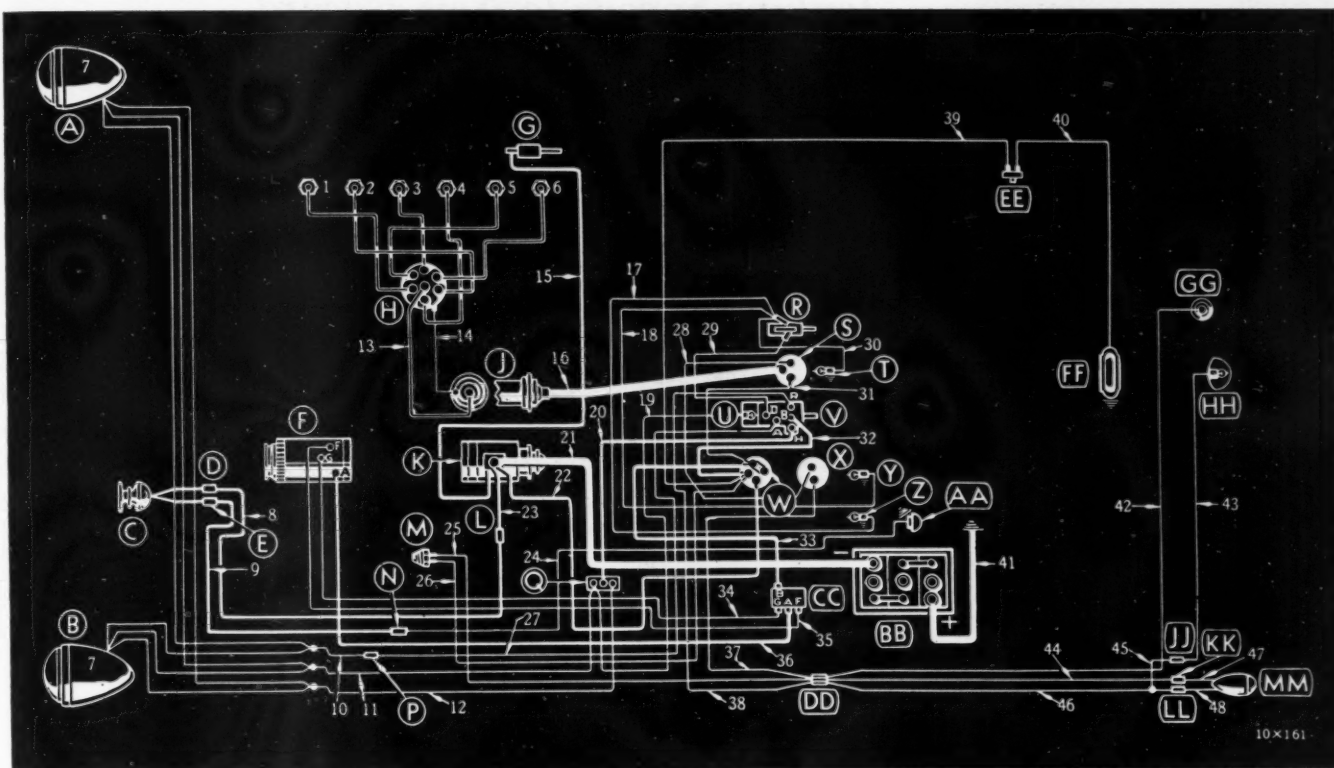
AXLE end-play on both of these cars is taken care of by means of a spacer block which is placed between the ends of the axle shaft. These blocks can be secured in various oversizes so you should have no difficulty in overcoming your trouble.

Incidentally, some of the blocks are not perfectly square and placing them in one way will give you less end-play than if the block is turned over.



"This car always gets the shivers when it passes a graveyard!"





1937 Dodge Wiring Diagram

## UNEQUAL BRAKES

We have a 1935 Packard 120 that we relined the brakes on. We have checked both the eccentric adjustment and the anchor adjustments with the proper feeler gages.

We have even gone so far as to put a new rubber hose on the right front wheel and after doing what we think everything, the car still pulls very sharply to the left. Have even put in new wheel cylinder cups. This is a Bendix, two shoe hydraulic brake. The rear wheels and the left front stop alike. We would appreciate any information you may convey to us. Bergen Point Garage, 385 Broadway, Bayonne, N. J.

THE first thing I would do on your 1935 Packard would be to hone out the wheel cylinders and install new cups. The reason for this is that it often happens there is a slight gum-

my deposit in the cylinder which causes a sluggish action. This will show up after a brake reline because of the altered position of the cups which now must move over the gummed surface of the cylinder whereas before they were working over a clean portion.

I assume, of course, that the lining has no grease on it and that both drums are true. In addition, I'd suggest that you check the front springs to make sure that they have the same characteristics and also go over the bushings in the independent suspension system to make sure that they are not worn.

the wheel cylinders that the trouble arises. The reason is that with the old lining, the cups in the wheel cylinders were traveling over a certain area of the wheel cylinder. That particular portion would be bright and shiny whereas the remainder of the cylinder would be gummy. Then, when the brakes were relined the cups would be traveling over the gummy surface

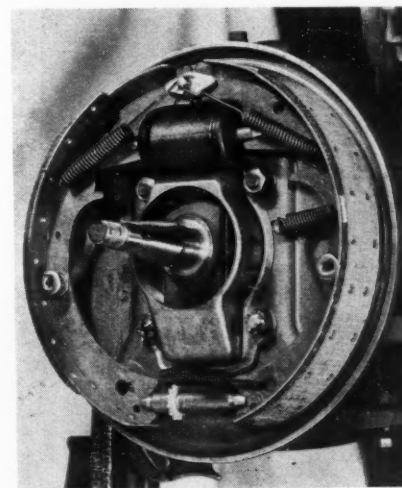


## PULLS TO THE LEFT

We would like to ask if you have any suggestion in regard to the adjustment of Bendix hydraulic brakes such as are used on the 1936 Buicks and other cars, in order to correct a chronic difficulty which seems to exist of pulling either to the right or left when the brakes are applied. New York Subscriber.

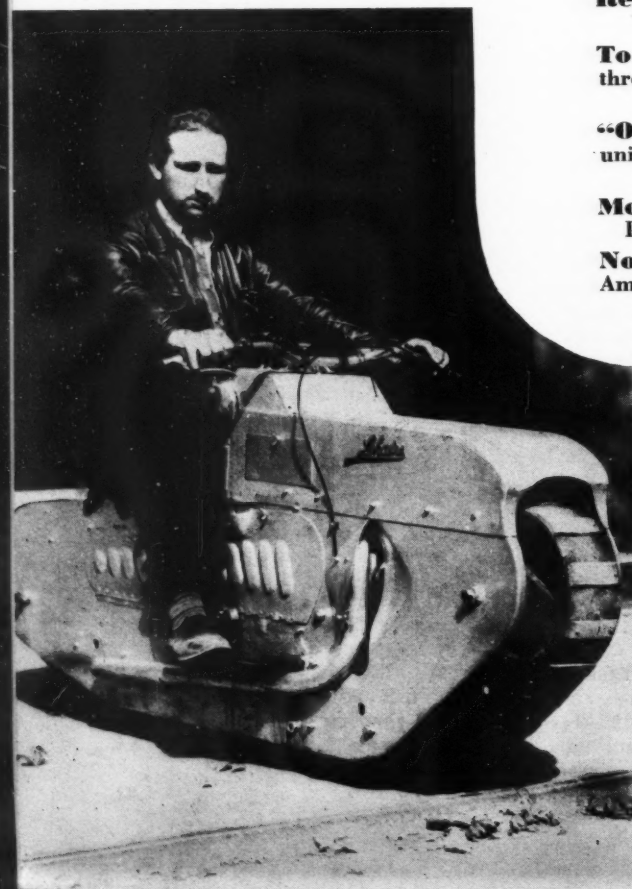
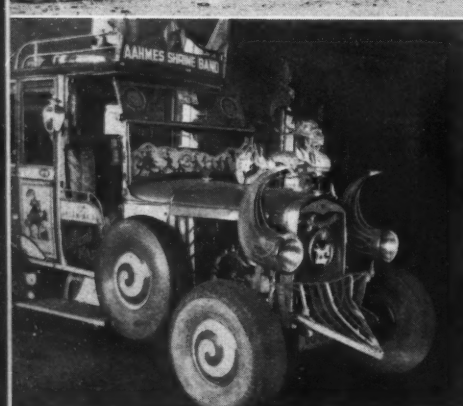
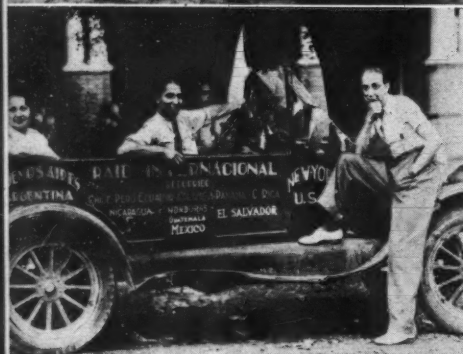
IN the majority of cases that have come to my attention, the cause of Buick car pulling to the right or to the left has been found to lie in defective wheel cylinders and cups, empty shock absorbers or weak chassis springs.

It often happens that when a brake system is relined without overhauling



of the cylinder with the result that unequal brake applications would result. Thorough cleaning of the wheel cylinders overcomes the trouble.

In addition it is advisable to thoroughly flush out the entire system each time the brakes are relined and refill with clean fluid.



## Jenkins Speeds to New Record Driving Stock Sedan

As a sidelight to his racing speed run, which he has made annually since 1932, Jenkins accelerated a Cord sedan to the fastest speed ever credited to a stock car. Over a measured mile he shoved the speedometer, by actual check with electric timing device, to 107.66 m.p.h. And, with the assistance of Updike and Oliver, factory drivers who gave relief at the wheel, Jenkins held the car to 101.72 m.p.h. for 24 hours of continuous driving. He did not attempt records beyond 24 hours. For the first hour he was clocked at 104.44 m.p.h.; for three hours, at 104.44 m.p.h.; six hours, 103.58 m.p.h., and for twelve hours, 102.81 m.p.h.

Gulf motor fuel, oil and gear and chassis lubricants were used, accord-

ing to credit given by the AAA Contest Board.

The new distance records just announced by the AAA Contest Board in Jenkins' credit and added to the shorter marks which appeared in the October MOTOR AGE are given below:

Captain Eyston was forced to halt his second attempt on the afternoon of Oct. 14 with only one of the American ace's records claimed. Before rain halted his bid at 4:30 o'clock in the afternoon Eyston had surpassed the 2000 kilometer record by boosting the gait to 163.60. He had passed the 12-hour mark without bettering Jenkins' speed and was struggling toward the 24-hour bracket in the rain when he was forced to give up his on his fifteenth hour.

### World's Unlimited and International Class "A" (Standing Start)

Distance	Time	M.P.H.	Former Record—Held by
500 Km.	1:47:49.614	172.88	*169.11—Jenkins
500 Mi.	2:55:37.074	170.83	168.44—Jenkins
1000 Km.	3:37:17.616	171.58	166.65—Jenkins
1000 Mi.	5:56:54.378	168.11	165.73—Jenkins
*2000 Km.	7:37:30.894	162.97	157.18—Jenkins
2000 Mi.	12:29:38.964	160.07	152.96—Cobb
3000 Km.	11:32:58.062	161.40	153.95—Cobb
3000 Mi.	18:56:33.198	158.37	153.60—Jenkins
4000 Km.	15:37:07.488	159.13	152.60—Jenkins
5000 Km.	19:41:17.256	157.80	153.96—Jenkins
3 Hours	512.823 Miles	170.94	168.46—Jenkins
6 Hours	1008.882 Miles	168.15	165.72—Jenkins
12 Hours	1921.984 Miles	160.17	153.98—Cobb
24 Hours	3774.458 Miles	157.27	153.77—Jenkins

\*Record set Sept. 8, this year, in earlier attempt at Bonneville; all other former records were established at Bonneville in September of 1936. This record raised to 163.60 M.P.H. by G. Eyston.

### Down the Column:

**Reclining** while driving is M. Villeneuve of Paris who invented this unusual contraption for foot-power travel on land and water.

**To win a bet** Miguel Divo drove with wife and friend 23,000 miles through jungles and over mountains to New York from Buenos Aires. P. S.—He's returning by boat.

**"Official Kar"** of Aahmes Shrine Band of Oakland, California, this unique automobile is equipped with everything calculated to make its appearance funny and noisy.

**Motor-cycle Tractor** which travels twenty m.p.h. over uneven ground. Its French inventor claims it is ideal for climbing steep, uneven grades.

**Not Charlie Chaplin**, but an English comedian, who resembles the American star, performs acrobatics on what is believed to be the world's smallest motorcycle.





## U. S. Bureau of Public Roads Reports to Congress on Highway Safety

Blinding headlight glare is "the most baffling problem" faced by design engineers in reducing the number of night highway accidents, according to the U. S. Bureau of Public Roads.

In its special report on highway safety and traffic conditions, the Bureau reported to Congress that night accidents are much more numerous in proportion to traffic than day accidents despite the millions spent in research and improvements on headlamps and accessories.

Referring to the present multiple-beam headlight with manual control by driver, the Bureau conceded it to be "the best type available" but pointed out that drivers not always use the proper beam and that there are many conditions of "gradient and curvature under which even a correctly adjusted beam will blind an approaching driver."

The report explained that polarized light beams, colored filters, magnetic or photo-electric operated beams are among the possibilities under consideration by designers for eliminat-

ing headlight glare. None of these, however, are yet commercially practicable, it was said, but polarized light offers "some interesting possibilities."

Discussing the modern four-wheel brakes, the road bureau described improvements in drums, lining and operating mechanism as "greatly promoting highway safety." It added that "room for further progress" is found in increasing the life of brake lining and drums and in greater ease of adjustment and facility of operation. Specifically, it objected to the control of brakes and acceleration by the same foot and cited the time-lag necessary between the two operations which in times of emergency "may be important." It said that investigation of the chances for eliminating this defect should be "worthwhile."

Turning to the subject of "fading," the report said it is a condition that has not been wholly overcome but that it is now being remedied by better heat radiation from the drums, and by approximately equalizing expansion coefficients of drums and shoes.

## MEMA Monthly Business Index

(January, 1925, equals 100)

	Aug. 1937	July 1937	Aug. 1936
Original Equipment Shipments to Vehicle Mfrs. ....	140	153	108
Service Parts Shipments to Wholesalers .....	164	154	147
Accessories Shipments to Wholesalers .....	118	116	75
Service Equipment Shipments to Wholesalers .....	131	127	106
GRAND INDEX (Composite) of above divisions .....	141	148	110
Index Car and Truck Production .....	169	190	115
Index General Business (Bank Transactions) .....	70	80	68

### Down the Column:

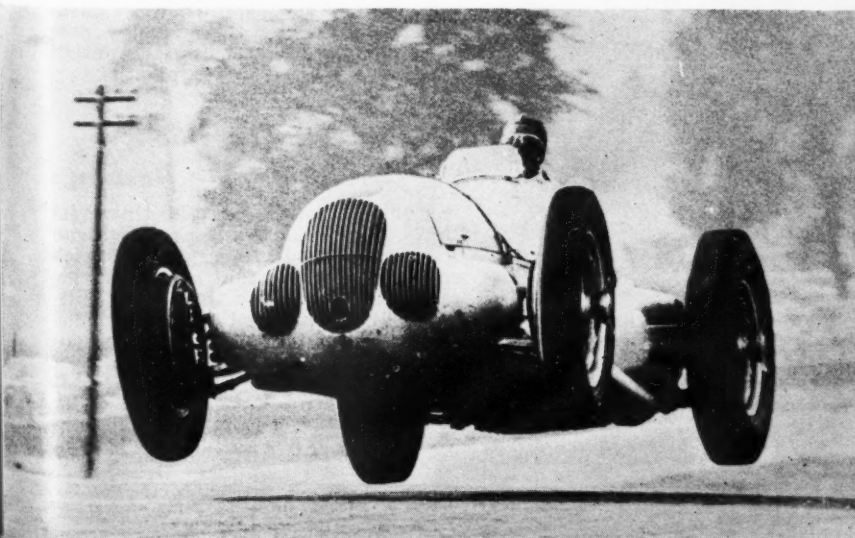
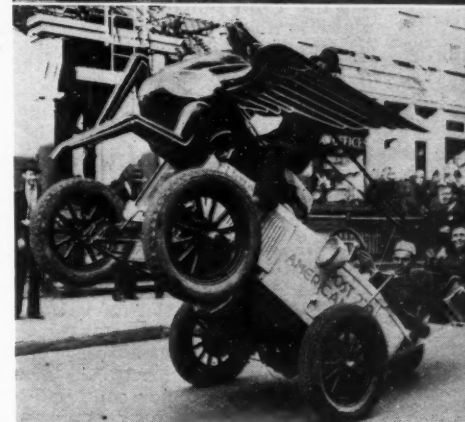
**Some fun** for "Flash" Williams, stunt driver, as he skates along the ground on his stomach after a head-on stunt "crash" exhibition at a fair.

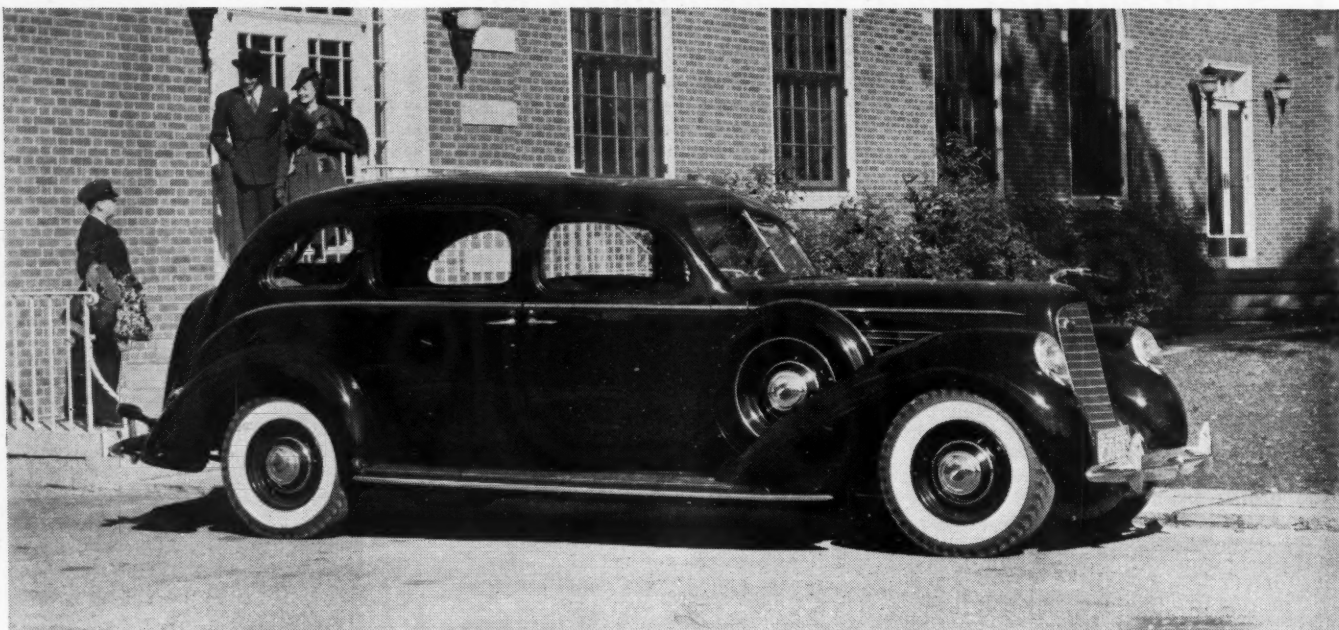
**More fun**, if you like your thrills upside down. Williams upsets a speeding sedan just to amuse the crowd. This practise is not recommended for the average driver.

**Still more fun** was this bucking broncho on wheels. One of the sights which amused the spectators at the recent American Legion Parade in New York.

**Short rides** in shorts are taken by Dorothy Short, screen actress, as she travels here and there about the motion picture lots in Hollywood.

**Taking off** as if for a flight is this Mercedes racer pictured with four wheels off the ground. It finished second in the 250-mile Grand Prix race in England.





On the 1938 Lincoln motor cars louvres have been redesigned, the radiator grille appears in a new harmonious pattern and there is a restrained use of chromium in the belt moulding and the louvres. Twenty-one body types comprise the Lincoln group, four built by Lincoln, the others by four famous coachmakers, Brunn, Judkins, LeBaron and Willoughby. The car is powered by a 150 horsepower V-type 12 cylinder engine.

### Battery Market Increasing

According to the Electric Storage Battery Co., as reported in "Exide News," the replacement market for storage batteries for the last half of 1937 is at least 10,000,000 units. This represents a market that is bigger by 10 per cent than any that ever existed before the storage battery replacements. Coupled with this is an average increase of 9 per cent in battery prices to bring the total potential volume up 19 per cent.

Other favorable factors are the news that total registrations of higher-priced cars, \$750 and up, have increased by 42 per cent as against a 26 per cent increase for all types of cars; plus the fact that even the new smaller cars are using larger batteries.

### Maremont Moves

#### Brooklyn Warehouse

Maremont Automotive Products, manufacturers of replacement and helper springs at Chicago, have changed their warehouse headquarters in Brooklyn and now have their own exclusively operated branch at 1651 Bedford Avenue.

The rapidly increasing use of their warehouse facilities by the jobbers and spring service stations in the Metropolitan area and surrounding territory has prompted this move, which enables the Maremont Automotive Products to greatly improve their service facilities for their trade. The stock has been substantially increased and they are prepared to give immediate delivery on all springs, main leaves and helper springs.

### New Records for Motor Industry Indicated

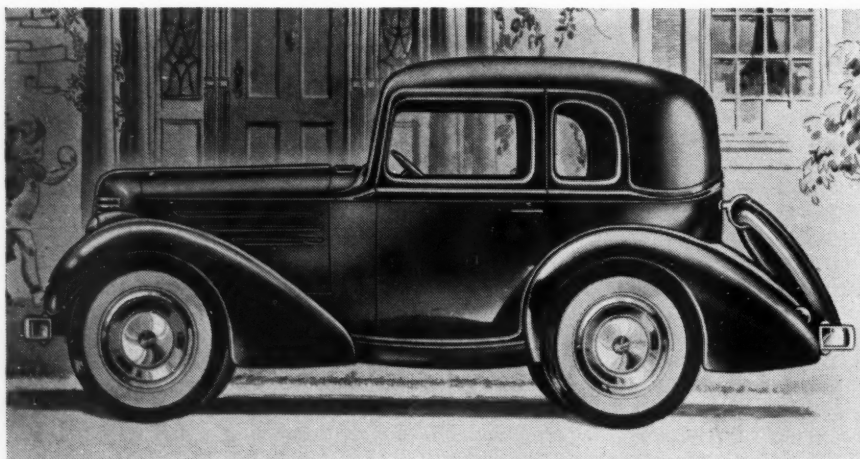
Ownership of motor vehicles in the United States and in the entire world has advanced to new records, a statistical survey released today by the Automobile Manufacturers Association establishes. The survey which contains figures pertaining to the operations of the motor industry during the twelve months preceding the current Automobile Show period reveals that a number of other new records have also been set.

The association estimated motor vehicle registrations in the United States at 29,000,000, of which 24,600,000 were classified as passenger cars and 4,400,000 as commercial vehicles.

Registrations in the United States accounted for 70 per cent of the 41,750,000 motor vehicles in service throughout the world.

Domestic use of motor vehicles, as measured by gasoline consumption set a new record during the twelve months' period with 19,300,000,000 gallons of gasoline being consumed in motor vehicles.

Eighteen thousand motor buses were produced by the industry during the period—exceeding the output for any previous twelve months.



Illustrating the new American Bantam which was described in the September issue of Motor Age. While bore and stroke remain the same as on the original Austin, power has been increased by means of a 7 to 1 compression aluminum cylinder head. Semi-elliptic springs are now used at the rear.

### Mufflers Fitted With Adjustable Bushings

Mufflers manufactured by Universal Parts, Inc., 1523 to 1531 S. Michigan Ave., Chicago, Ill., are fitted at each end with bushings that are adjustable as to size, so that a line of 20 mufflers can be adapted to almost 1000 cars, trucks and buses, according to the manufacturer. The bushing is a patented feature of Universal mufflers.



## Vanderbilt Cup Race Scheduled for Independence Day

The George Vanderbilt Cup Race on the Roosevelt Raceway at Westbury, Long Island, will be an Independence Day event again in 1938. The second running of the classic has been set down for July 4 by the Sporting Commission of the International Association of Recognized Automobile Clubs, at headquarters in Paris, France.

The race this year was originally scheduled for July 5, later moved up to July 3, and finally run on July 5 when rain brought postponement. The first George Vanderbilt Cup Race was run Oct. 12, 1936, when the raceway was inaugurated.

While the announcement from international headquarters did not list the distance, it is said here that the event again will be 300 miles, the distance run in this year's race won by Bernd Rosemeyer, the German ace. The first Vanderbilt cup event, a 400-mile grind, was won by Tazio Nuvolari, of Italy.

It was said in reliable quarters that the original plan of two major events a year at Roosevelt Raceway would not be carried out in 1938. It was said that the George Vanderbilt Cup would likely be the only race there. A Pan-American Sweepstakes scheduled as a fall event there this year was abandoned in a September announcement. The cancellation came on the heels of removal of the 300-mile race scheduled in conjunction with the Greater Texas and Pan American Exposition at Dallas.

## New Ridge Reamer

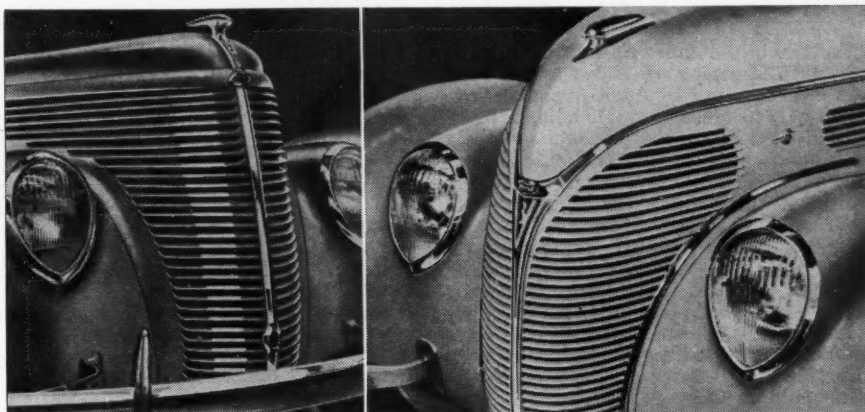
A companion to their Master Model ridge reamer has been introduced by the Lisle Corp., Clarinda, Iowa. It is known as the "Superange" ridge reamer, and will work in cylinders from 2.6 in. to 4 in. bore. This is a particularly useful size, in that it will take the Ford 60 cylinders as well as all others up to 4 in. It has the same features as the Master Model, which is already in extensive use throughout the country.



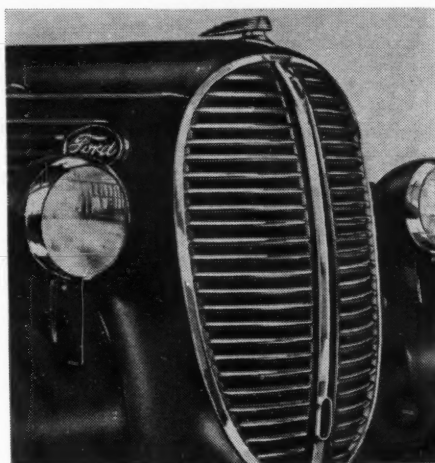
"Honest, lady, when I said you needed new rubber, I wasn't referring to your girdle!"

MOTOR AGE, November, 1937

## 1938 Ford Cars Announced



Front ends of standard (left) and DeLuxe Ford V-8's



The "one tonner" truck

For the coming selling season Ford again offers a single chassis with either the 60 or 85 hp. engine. However these cars will differ in appearance and will be known as the deluxe and the standard models. Mechanical changes are in the nature of refinements. Ford also announces a new group of 1-ton trucks which are in addition to the 112-in. commercial cars and the 134 and 157-in. wheelbase trucks.

Eight deluxe bodies and three standard bodies are available on the deluxe passenger car chassis and the radiator grille is of entirely new design and appearance of the hood is longer and more sweeping. Interiors have been changed not only from an appearance point of view but also from comfort. There is more room in the closed sedans and greater luggage space is provided.

Frontal appearance of the standard or 60 hp. car has also been improved with a different radiator grille, long hood and flowing contours. Three standard bodies are available on this chassis.

The new one tonner is designed specifically to bridge the gap between the commercial cars and truck groups. Available with either the 85 hp. or 60 hp. engines, it is expected to make the economies of the latter engine more widely available in commercial transportation.

Other advances for 1938 are the new 134 in. wheelbase truck replacing the 131½ in. wheelbase in the big truck line, a new frame width for the 134 in. and 157 in. wheelbase units, improved brakes and easier steering and stronger construction throughout.

## Lockheed Display

An attractive display card featuring Wagner Lockheed hydraulic brake fluid is one of the latest sales helps developed by the Automotive Parts Division of the Wagner Electric Corp., 6400 Plymouth Avenue, St. Louis, Mo. It can be used as a counter display, placed in a gasoline pump island display case, or in a display window. The card is 10½ in. wide x 12 in. high, and is printed in red, white and blue. It is die-cut to permit a pint can of brake fluid to become part of the display.

## Blue Cars Dominate

### Paris Show

One-fifth of the 298 cars exhibited at the Paris Automobile Show, in the Grand Palais, were in blue of one shade or another with black and gray jointly taking second place, according to Philip H. Chase, color specialist of the Duco Color Advisory Service. Black was the most popular color at the show last year and has been a leader in color selection for a long time. Maroon also climbed up near the top, going into fourth place with yellow, green, beige, brown and red following, in the order given. Brown was a prominent color last year. There was an increase in the use of metallic colors this year.

The leading upholstery materials used were leather and leather substitutes, nearly half of the cars being shown in these, followed by plain cloth mostly in gray or fawn. The remainder were divided between fancy cloth, pile fabrics, and Bedford cord. Thus, leather and leather substitutes show a slight but continuous and steady increase, due, to some extent, to the increasing popularity of the convertible type of car.

## Greatest Number of Car Owners to be Found in Low Income Group

Automobile ownership among families with incomes of \$30 a week or less is expanding by 1,000,000 a year, and by 1940 close to 15,000,000 families in modest or low income groups will be owners of motor vehicles if the present trend continues. Two-thirds of the cars in this country by 1940 will be owned by families having incomes of \$30 a week or less, and only one-third of the car-owning families will fall in the income class above \$30 a week, Baird H. Markham, director of the American Petroleum Industries Committee, asserted at an interstate conference on gasoline taxation held in Chicago, Ill.

"There are 25,000,000 passenger cars operating on American highways. In all the rest of the world there are only 9,000,000. In this country we have one motor vehicle, including trucks, for every 4.5 persons in our population. For the balance of

the world there is only one motor vehicle for every 50 persons. These facts of automobile ownership," said Mr. Markham, "indicate most graphically that the standards of living in the United States are far above those of any other nation of the world and that the comforts and advantages of human progress and modern living are filtering down among the masses to a degree unknown in any part of the civilized world. More than half of the motor vehicles in this country are now owned by families with incomes of \$20 to \$30 per week, or even less."

### Ingersoll-Rand Catalog Out

A new catalog covering their complete line of air compressors for garage and service station use has been issued by Ingersoll-Rand Co., Phillipsburg, N. J. Copy of the new catalog will be sent upon request.



**Treadwheel** A new cycle which recently made its appearance on the streets of Berlin. The bike has no chain, the power being transmitted to the rear wheels by means of a system of levers. It is claimed the new system saves 50 per cent energy.

### Shut-Off Valve For Heater

A vacuum-controlled valve located in the water jacket to turn off or on the flow of water to the hot water heater has been announced by the Everhot Products Co., 2055-59 West Carroll Ave., Chicago, Ill. Known as the Vacuumatic heater switch shut-off valve, it operates by a switch located on the instrument panel, and derives its vacuum from the windshield wiper tube. Its use permits faster heat from the hot water heater since heated water from the engine block can be turned into the heater without waiting for

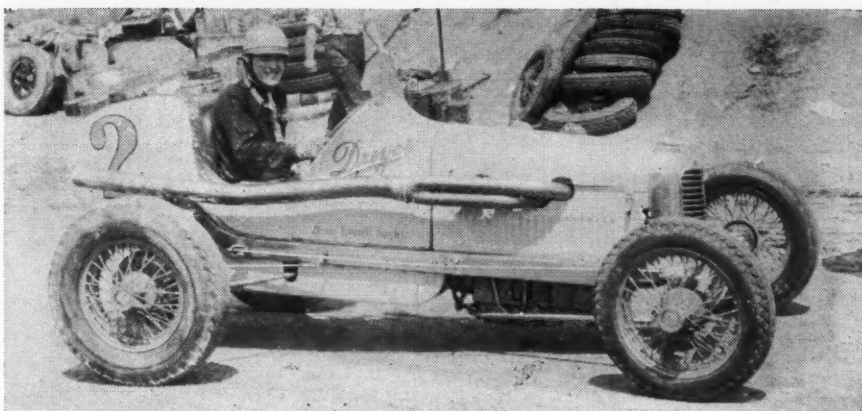


the normal flow to and from the heater. Also, the flow of water to the heater can be cut off during summer and the heater fan used to circulate air within the car, making the heater an all-year-round accessory. The shut-off valve is located in the hot water take-off fitting at the block, and is easily installed. List price \$2.95.



Graham distributors and dealers, gathered in Detroit to see the new 1938 Graham and hear plans for its introduction at the New York Automobile Show, also were treated to a vision of pulchritude as girls in page costumes displayed sample advertisements.





**Champion** Everett Saylor at the wheel of his Dreyer Special

## Saylor 1937 C.S.R.A. Champ

Everett Saylor now holds the 1937 championship title of the Central States Racing Association by virtue of annexing the highest number of points. The former Hoosier School Master piloted a Dreyer Special. Joie Chitwood, full-blooded Cherokee Indian, drove the late Red Campbell's Morgan Miller into second place standing, after Campbell met an untimely death last May on the famed Winchester, Ind., bowl.

Weekly races were held on the C.S.R.A. circuit from the last of April through the middle of October, with a goodly number of fair dates sandwiched in. A minimum purse of \$1,000 comes under the C.S.R.A. sanction, but on numerous occasions the purse was more than doubled for the weekly meets.

Prospects for the 1938 racing season appear bright with additional tracks running under the C.S.R.A.

### Bear in 75% of Arkansas' Stations

Since the recent passage of the Arkansas safety law, 31 municipalities in that state have made arrangements to have official testing stations. Of these stations, about 75% have purchased Bear Testing Equipment.

### Mercon Company

#### Appoints Representatives

Mercon Company of Lock Haven, Pa., and Chicago, Ill., manufacturers of a complete line of armatures, generators and field coils, announce the appointment of the following as their manufacturer's representatives:

Lawrence M. Hirsig, Inc., Union Terminal, Jacksonville, Fla., operating in the States of Virginia, Florida, Georgia, Tennessee, Alabama, North Carolina, South Carolina, West Virginia and Mississippi.

A. H. Hirsig Company, Clayton, Mo., operating in the States of Oklahoma, Texas, Louisiana and Arkansas.

Sidney J. Black Company, 308 W. Washington St., Chicago, Ill., operating in the States of Illinois, Missouri, Kansas, Colorado, Wyoming, Montana, Ohio and Canada.

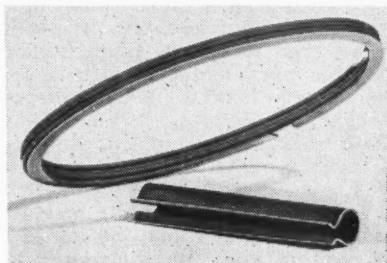
### Twin Wipers Required

A recent amendment to the Traffic and Motor Vehicle Regulations for the District of Columbia states, in part:

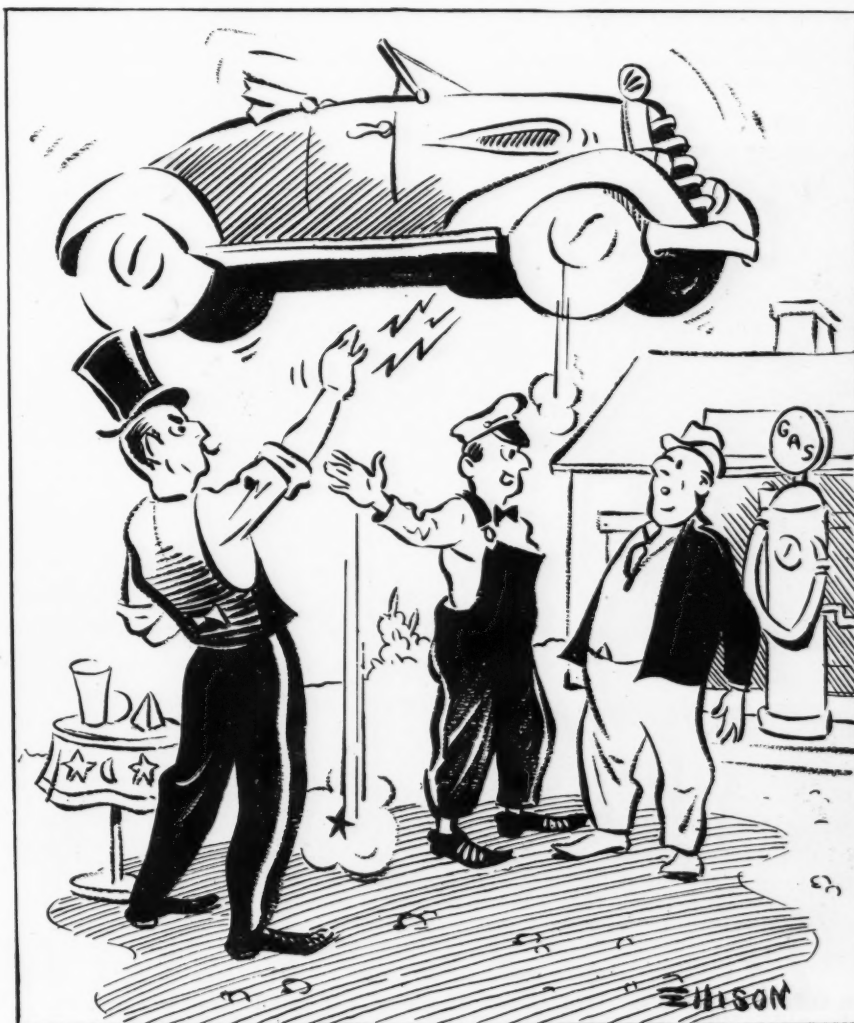
"No motor vehicle manufactured after January 1, 1938, shall be registered or titled in the District unless the same is equipped with windshield wipers capable of wiping the right and left hand sides of the windshield."

### Segment Piston Rings

Piston rings that are slightly dished, and supplied in separate segments to properly fill the width of the ring groove and provide an adequate control of oil consumption are manufactured by the Haling Piston Ring Co., Rochester, Minn., with sales department at 4750 Sheridan Road, Chicago, Ill. These rings are installed so that there is no open gap in the groove, and the dished construction provides a tight seal in the groove so that oil cannot pass by in back of the ring. In addition to the piston rings, the Haling company also has a piston ex-



pander which fits into the slot of the piston and provides equal expansion for the entire length of the skirt. The rings are sold in complete sets for all the popular make cars, and the expanders are supplied in four lengths to accommodate any piston.



"I hired him when my grease rack broke down!"

## Car Sales Up 20 Per Cent

Factory sales of motor vehicles by American manufacturers in September were 20 per cent above the corresponding month of last year, the preliminary estimate of the Automobile Manufacturers Association, disclosed.

The industry's September shipments, according to the Association, amounted to 168,166 cars and trucks.

On the basis of the Association's estimate, the industry's shipments for the first nine months amounted to 3,947,559 cars and trucks, an increase of 14 per cent over the 3,461,468 volume recorded for the same period last year.

The report, which is based upon factory shipments of all major producers of motor vehicles in the United States, is summarized below.

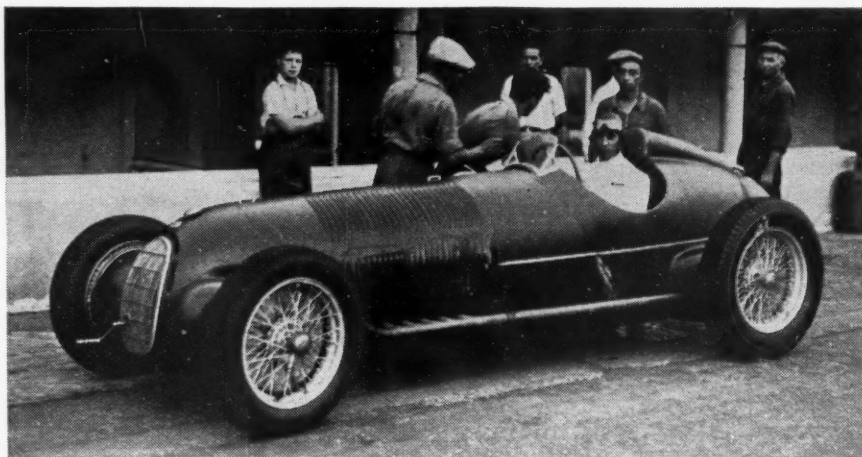
September, 1937 .....	168,166
August, 1937 .....	405,064
September, 1936 .....	139,820
9 months, 1937 .....	3,947,559
9 months, 1936 .....	3,461,468

## New Head for

### Monroe Auto Equipment

New chief executives for the Monroe Auto Equipment Co. have been chosen following the death of Charles S. McIntyre on August 26. Mr. McIntyre was president and treasurer for Monroe.

The new officers are B. D. McIntyre, president and general manager, A. F. Meyer, vice-president, W. D. McIntyre, vice-president and treasurer, and C. S. McIntyre, Jr., secretary.



**Ready for New Records** Tazio Nuvolari, the famous Italian racer who won the George Vanderbilt Cup in 1936, is shown with his new 12-cylinder Alfa-Romeo, after his first test run. He is planning on giving both Auto-Union and Mercedes a good lacing next season with this super speed job.

## New Distributors For

### Homestead Valve Company

The Homestead Valve Mfg. Co. recently announced the appointment of four new distributors for their Hypressure Jenny Steam Vapor Spray Cleaners: Automotive Equipment Supply Co., Washington Blvd., St. Louis, Mo.; Cummings & Emerson, S. Washington St., Peoria, Ill.; Grinold Auto Parts, Inc., Hudson St., Hartford, Conn.; General Auto Supplies, E. Market St., New Albany, Ind.

## Four-Wheel Drive Race Car

### to be Driven by De Paolo

Peter De Paolo, veteran racing car driver, twice-winner of the national AAA racing championship, and 1925 winner at the Indianapolis Speedway, is the 1938 nominee to handle the FWD four-wheel drive race car. This announcement was made by President Walter A. Olen of the Four-Wheel Drive Auto Company, owners of the car.

De Paolo took the car to Los Angeles where it will be rebuilt and remodeled for the 1938 Speedway Classic. Reduction of the weight of the car increase of its horsepower and speed, and other refinements are planned.

Besides the 1938 Indianapolis 500-miler, the FWD race car will be entered in the Roosevelt Speedway. Mr. De Paolo will have complete charge of the car, as he had during the 1937 Classic. Following De Paolo's rebuilding of the car, the FWD will be tested at Muroc Lake, a dry lake near Los Angeles.

## Holmes Company Introduces

### New Towing Cradle

The Ernest Holmes Company, manufacturers of the Holmes double-boom wrecker, announced this month a new Hi-Speed towing cradle. This new towing equipment is light, practical, and designed to handle all makes of passenger cars and light trucks of either conventional axle or knee-action type.

With this new equipment difficulties now encountered on the modern streamlined cars will be eliminated. Either end of a disabled car may be lifted, for the cradle may be lowered into position and firmly clamped to either front or rear axle. The towing or turning pivot is placed immediately back of the service truck. This forces the towed car to follow in the same path without swaying out of traffic lane when turning or jamming into service truck on quick stops.

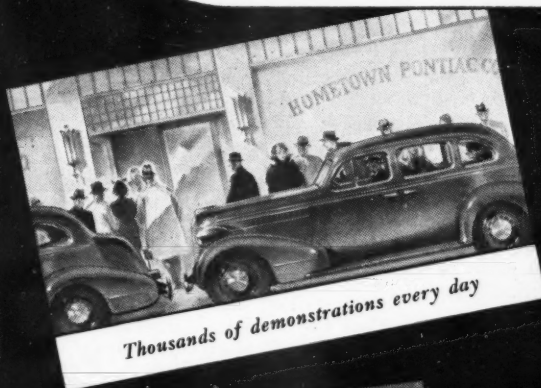


**The fair lassies** above are seated in one of the small cars displayed recently at the Miniature Automobile Show in New York. The show featured pedal-powered cars, scale models and even Soap Box Derby models.



# PROOF APLENTY

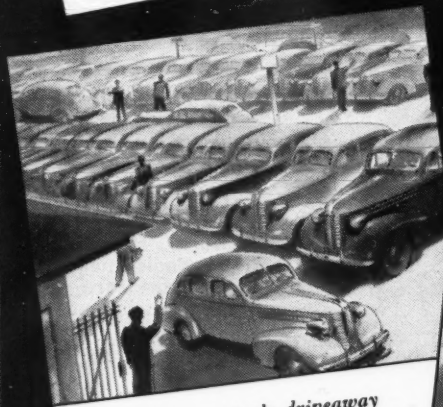
THAT PONTIAC DEALERS ARE HEADING  
FOR ANOTHER RECORD-BREAKING YEAR!



Thousands of demonstrations every day



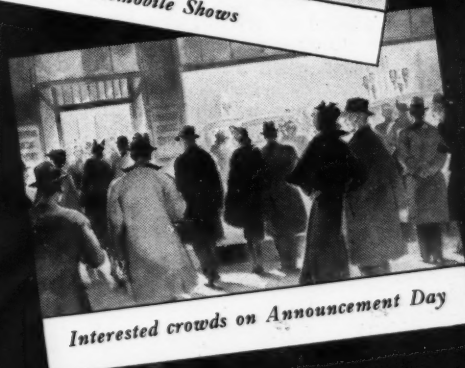
Loud acclaim at the Automobile Shows



The biggest single driveway  
in automotive industry



Exceptional interest in the new  
Safety Shift Gear Control\*



Interested crowds on Announcement Day

**R**IGHT on the heels of a year which saw all past Pontiac records toppled and left dealers more prosperous than ever before, Pontiac presented new Silver Streaks that represent another "ten strike" in Pontiac's progressive program.


You can't call it *luck* when that same thing happens year after year. You've got to look deeper for the cause of Pontiac's steady climb. And what you'll find as a result of such an investigation will prove to you that Pontiac's money-making possibilities have scarcely been touched as yet. If you are interested in finding out why Pontiac occupies its present enviable position, and what Pontiac plans for its dealers in the years to come, write to C. P. Simpson, General Sales Manager, Pontiac

Motor Division, General Motors Sales Corporation, Pontiac Mich., for detailed information. Your communication will be considered strictly confidential.

*Check against the selling features of any automobile these latest and greatest features of America's finest low-priced car*

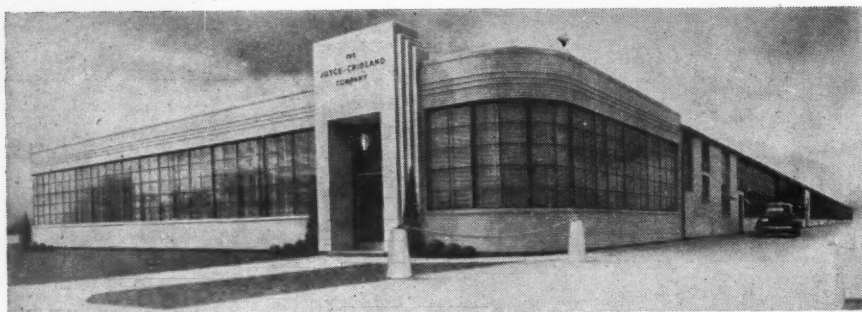
NEW SAFETY SHIFT GEAR CONTROL\* (optional at slight extra cost) • NEW SILVER STREAK STYLING • NEW CLUTCH PEDAL BOOSTER • NEW SAFETY STYLED INTERIORS • NEW BATTERY LOCATION • PERFECTED KNEE-ACTION RIDE • IMPROVED CENTER-POINT STEERING • BIG-CAR WHEELBASE (117" on Six, 122" on Eight) • TRIPLE-SEALED HYDRAULIC BRAKES • UNISTEEL BODIES BY FISHER

# Prosper with PONTIAC

 *Second Biggest Seller in the General Motors Line*

MOTOR AGE, November, 1937

When writing to advertisers please mention Motor Age



**NEW HOME** for Joyce-Cridland Co., in Dayton, Ohio. Three other factory buildings have been outgrown in the progress of this Hydraulic Lift concern.

## Ford Announces Expansion Program

A new Ford Motor Company Rouge Plant expansion program, which will cost upward of \$40,000,000 and rivals in extent the Company's unprecedented 1934-5 building program, has just been announced.

The new building included in the program is intended to enable the Ford Company to maintain, in face of increasing production, its policy of manufacturing in its own plants a substantial share of all the parts required in the manufacture of Ford V-8 cars and trucks.

Coincident with the announcement of the building program, Ford made public an award of a contract for a giant new 1,000-ton blast furnace, which will cost, with auxiliaries, \$4,500,000.

The new furnace will be the first all-welded blast furnace in the world.

## New NAPA Manual

A new 46-page repair manual covering all phases of service on 1937 Chevrolet models has been published by the National Automotive Parts Association as the latest addition to their comprehensive Mechanics' Repair Manual Series.

Although the fourth manual to be issued, the new book is Volume II on Chevrolet maintenance problems. The first volume, published early last year, contains information on Chevrolet models from 1931 to 1936 inclusive.

Other manuals published by NAPA cover Ford V-8 models from 1932 through 1936, and Plymouth, thus giving mechanics access to complete service data on the three makes of cars that constitute the largest percentage of their repair work.

Manuals are available through all NAPA Warehouses and Jobbers at a cost of fifty cents each.

## Pierce Zone Governor

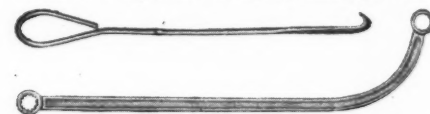
Pierce Zone Control is the name adopted for a new type governor which features three controlled speed ranges and a free range. Each range can be readily selected from the cap by a special four-position switch. A series of three lights at the rear of



the truck indicates the speed to which the truck is governed at any particular place or time. Chief value of the outfit, it is claimed, is the public good will gained by advertising the fact that the vehicle is operating within a fixed speed range conforming to a particular location. Maker, Pierce Governor Co., 116 Ohio Avenue, Anderson, Ind.

## Replaces Rear Oil Seal

A new set of tools which will enable the mechanic to replace the crankshaft rear bearing oil seal on Chrysler, DeSoto, Dodge and Plymouth cars without removing the transmission or flywheel, has been introduced by Snap-On Tools, Inc., Kenosha, Wis. The cap screws are loosened with the special wrench, and the old



oil seal is removed with the hooked tool. To replace the packing, the upper half is inserted as far as possible with the fingers and the hook used to complete the job.

## MEMA Gains New Members

According to Mr. A. H. Eichholz, general manager, Motor and Equipment Manufacturers Association, sixteen more manufacturers of automotive products have become affiliated with the MEMA.

Following are the names of the new companies not previously announced: Aircraft Specialties, Inc., Lapeer, Mich.; Anthes Force Oiler Co., Fort Madison, Iowa; Clifton Manufacturing Co., Waco, Texas; Crowe Name Plate & Mfg. Co., Chicago, Ill.; The Drackett Products Co., Cincinnati, Ohio; Economy Electric Lantern Co., Inc., Chicago, Ill.; Fowler-Pem Co., Emeryville, Cal.; Hawley Manufacturing Co., Inc., Chester, Pa.; Homestead Valve Mfg. Co., Coraopolis, Pa.; Linendoll Corp., Chicago, Ill.; The Lubrication Corp., Chicago, Ill.; L. J. Miley Co., Chicago, Ill.; Parts Manufacturing Corp., Brooklyn, N. Y.; Ryder Manufacturing Co., Inc., Chicago, Ill.; Steel Materials Corp., Detroit, Mich.; Sure-Rite Products Corp., Philadelphia, Pa.



"It's alright to signal, Dear, but don't grab things."



# THE BENDIX DRIVE EXCHANGE PLAN

is the only one that  
provides the customer with

*a new* **BENDIX  
DRIVE**

**T**HE Bendix Drive Exchange Plan not only builds profitable business for both jobber and service station but it does something else which no starter drive rebuilding service can offer.

It builds *Good Will* by supplying your customer with a complete new Bendix Drive.

When the owner brings his car in, the dealer or service station operator makes him a standard liberal allowance for his old Bendix Drive. The worn or broken drive is replaced with a new, factory tested Bendix Drive exactly the same as was supplied for original equipment to the car manufacturer. The old unit is placed in one of our empty cartons and returned to the distributor for credit. We credit the distributor.

What could be fairer, what could be simpler, what could go further toward assuring full satisfaction to all concerned?

Write for facts. New lower prices on Bendix Drives as well as many parts give you quick sales and real profits.



*Bendix Drives with the original box.*

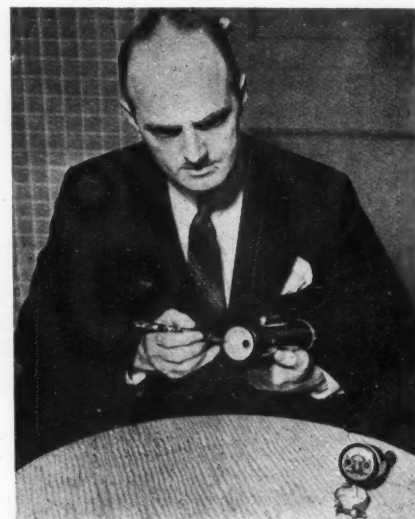
**ECLIPSE MACHINE COMPANY**  
ELMIRA, NEW YORK

*(Subsidiary of Bendix Aviation Corporation)*

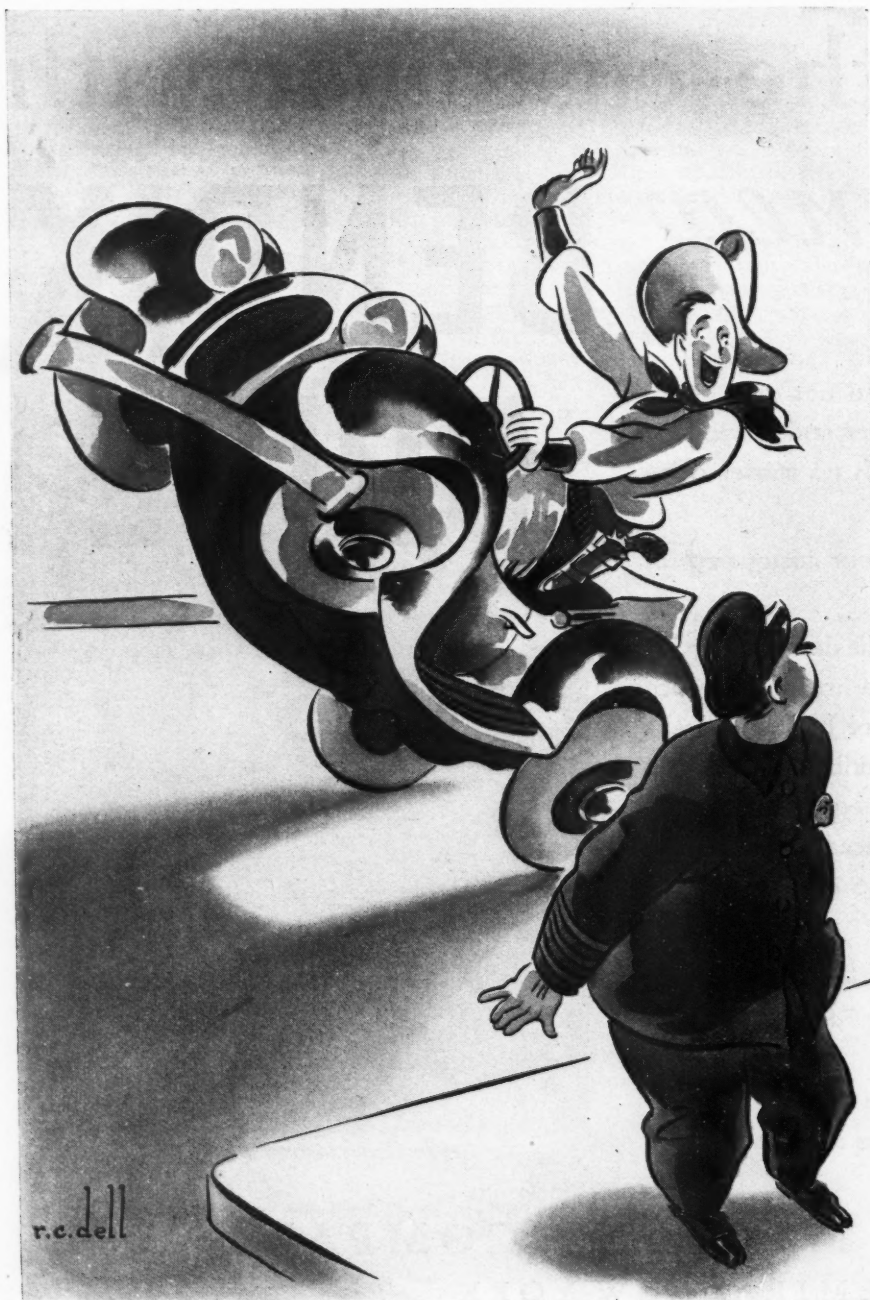
## Brake Tester Developed

A deceleration gage known as the Decelometer and intended principally for use by filling-station attendants and operators has been developed by R. J. Alden, vice-president of the Alden-Cowdrey Corporation of New York, in collaboration with engineers of the General Electric Co. and scientists of the National Bureau of Standards. In general appearance the instrument resembles a tubular two-cell flashlight. On its face are two small circular windows, one green, the other red. Inside is the working mechanism. On top of the case or shell is a small bubble-level which provides for proper positioning of the instrument.

During the testing operation, the Decelometer is placed on the floor of the car, directly in front of the inspector. A sharp set screw at the rear of the instrument holds it firmly in position, and prevents its being dislodged. When the brakes of the car under test are applied, the mercury in its channeled groove is thrown forward by its inertia, thereby effecting a mercury-switch action, and establishing contact with one or the other of the signal lights, operated by dry cells. If the forward motion is sufficiently fast to indicate proper braking efficiency, the mercury reaches the green signal; if not, the mercury reaches only the red signal. The instrument is calibrated to show whether or not the car can be stopped in 25 ft. from a speed of 20 m.p.h., which is the minimum requirement in many states having rigid brake-testing regulations.



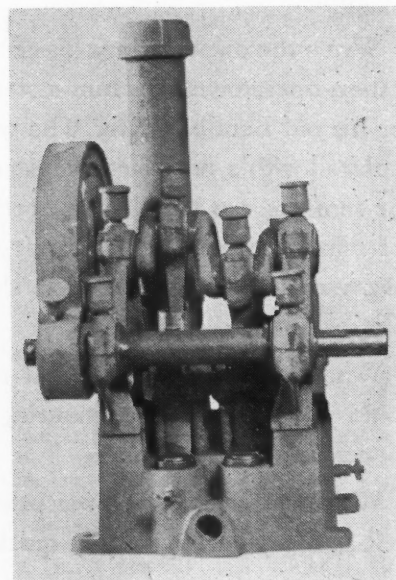
**Decelometer** R. J. Alden, Vice-President of the Alden-Cowdrey Corp., is shown holding the Decelometer, a new device for testing the brakes of an automobile. The Decelometer flashes a green light if the car is stopped in a safe distance and a red light if it is not. Mr. Alden, inventor of the device, is pointing to the red light of a sample for use on the floor of an automobile. On the table is another type which can be clamped to the steering post of a car.



*"Which way to the rodeo, officer?"*

## New Washer Added To Hardie Line

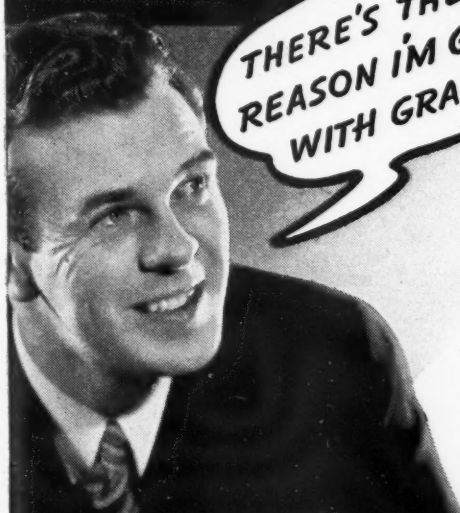
A new, smaller, low priced unit is the outstanding addition to the Hardie car washer line this fall. It is a 2-cylinder job which is said to deliver 3 to 4 gallons per minute at 300 to 350 lb. pressure per sq. in. It is intended to meet the need of the mass market for a light duty, low priced car wash-



er that will deliver ample capacity and pressure for the washing of small fleets and the volume of car washing service rendered by the average establishment. Maker, Hardie Mfg. Co., Mechanic St., Hudson, Mich.



# Here's the big MONEY-MAKER for 1938



THERE'S THE  
REASON I'M GOING  
WITH GRAHAM!

● Remember how the Blue Streak scooped the industry in '32! Now . . . Graham has done it again. Look at that racy, rakish thunderbolt of power in the picture! The new Graham! The big money-maker for 1938!

Study these quick facts. Then YOU decide whether you want to sell this car—or sell against it!

Graham gives you a "big package." 120-inch wheelbase. 197 inches overall. Performance—a car that will out-demonstrate any others in its price class. 90 horsepower in the SPECIAL . . . 116 horsepower in the SUPERCHARGERS!

Graham gives you economy! No "claims" . . . but a proved record. Holds the *Official* U. S. Economy

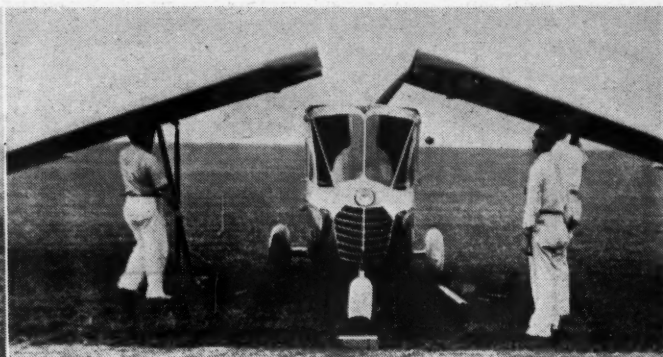
Championship—23.95 miles on a gallon. And we honestly believe it's the *safest* car on the road today.

Get the facts on Graham. Send this telegram, COLLECT, to F. R. Valpey, Vice-Pres. and Gen. Sales Manager, Graham-Paige Motors Corp., Detroit. "I'M INTERESTED. SEND FRANCHISE FACTS." Sign your name, your address. Do it today!

#### OPPORTUNITY FOR SALESMEN!

See the Graham dealer near you. Get with this "hot line" . . . don't miss out on the juicy earnings to be made on Graham this year. And you star salesmen who want to GO IN BUSINESS FOR YOURSELF . . . write for facts. This may be "your big chance" . . . don't miss it. Write today.

# GRAHAM for 1938



**Auto-Panel** The Waterman Arrowbile is a combination airplane and automobile. The wings can be detached, as shown in the photo, and the power from the motor switched from the propeller to the wheels for land travel. The plane is said to be one of the safest made. It can't loop or be forced to spin or stall.

### **B-L Electric Appoints Conrath As Sales Engineer**

The B-L Electric Mfg. Co., of St. Louis, announces the appointment of Louis R. Conrath as sales engineer. Formerly engaged in laboratory development work with this company, he resumes connections with B-L after an absence of several years.



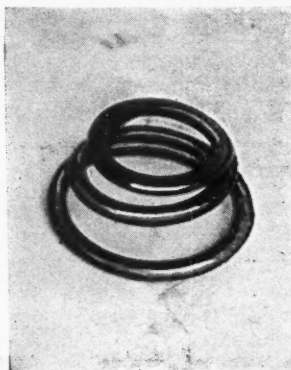
L. R. Conrath

### **New Philco Manual Available**

A new 64-page Philco Radio Manual is now being distributed to the trade. The new manual covers all models of Philco home and automobile radios. Also available is the 1937 edition of the Philco Auto Radio replacement chart. The chart lists every auto radio, standard as well as custom built, ever turned out by Transitone Automobile Radio Corp., Philco's auto radio division.

### **Anti-Rattler Spring**

The Spring Specialty Co., 4 North Eighth Avenue, Maywood, Ill., has introduced a take-up spring that can be installed on the shock absorber link on Ford cars to provide additional tension in the ball joint, and thus eliminate rattles at this point. It is



applicable to all 1936 and 1937 models, and is installed over the stud in the shock absorber arm connecting link. Packed eight springs to a set, and 12 sets per box. List price 60 cents per set of eight.

### **Auto-Lite Plugs Standard on 1938 Nash, Plymouth and DeSoto**

Auto-Lite spark plugs have been adopted as standard factory equipment by Nash, Plymouth and DeSoto for 1938.

The Electric Auto-Lite Company is rushing to completion an expansion program which will triple the output of its spark plug plant at Fostoria, Ohio, in order to meet the demand for the millions of spark plugs these companies will require.

### **Elsbert High-Frequency Ignition Coil**

A new ignition coil has been placed on the market by the Elsberr Mfg. Co., Inc., 353 West Grand Avenue, Chicago, Ill. Said to be entirely new in the ignition coil field, this new coil, in addition to furnishing the regular ignition current, develops an ultra-



high frequency oscillating current. By the use of this high frequency current the coil is said to develop from three to six times the regular ignition current of a standard ignition coil with less burning of the spark plugs and breaker points. Easier starting, better pick-up, longer life of spark plugs and points and smoother performance throughout the entire speed range are some of the advantages claimed for this new coil. Distribution is through the regular jobber channels.



**Oil Hose** New to British motorists is the system of oil delivery whereby engine oil is delivered direct from the pump to the crankcase, as in the case of gasoline from pump to fuel tank.



PERFECT



TEAMWORK

Football - NEW CARS - sure indications of Fall. And for the successful performance of either - PROTECTION is vital.

In football, there is the all-important man on the offense who protects the ball carrier, who blocks out trouble, who SMOOTHS the way.

In car operation, it is "dag" colloidal graphite, with its teammate oil, which is on the offense against wear and friction. Forming self-lubricating graphoid surfaces on engine

friction parts, "dag" colloidal graphite smooths the way for oil. It protects the metal parts during moments of extreme temperature and pressure and aids in the maintaining of full film lubrication.

Ask your oil supplier about his colloidal-graphited oils today and write us for our descriptive booklet 500 giving in detail data concerning "dag" colloidal graphite.

ACHESON COLLOIDS CORPORATION  
PORT HURON, MICHIGAN

dag

REG. U.S.

PAT. OFF.

COLLOIDAL PRODUCTS

COPYRIGHT 1937, ACHESON COLLOIDS CORP.

COLLOIDAL GRAPHITE

"DAG" COLLOIDAL GRAPHITE IS A 100% AMERICAN MADE MATERIAL

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## De Soto

(Continued from page 24)

rail, giving greater front seat rigidity. The rubber mountings prevent any metal to metal contact between frame and body.

Hydraulic brakes have been increased to 11 in. in diameter. The brake shoes are much heavier and stiffer. The drum is more rigid and has a higher, ribbed flange that gives better cooling.

The independent front wheel springing mechanism has been materially improved and contributes to the improved riding qualities. Upper control arms have been completely redesigned and are much more rigid. The rubber cushioning inside the coil springs is softer, smoothing the ride when the car goes over rocks or rough places in the road. All joints in the suspension set-up, where there are moving parts, have been sealed to keep out dirt and water, and to keep oil in the bearings. New hardened steel threaded bushings have been placed in the upper control arms.

The airplane type double-acting hydraulic shock absorbers, used both front and rear on the DeSoto, are mounted differently to give a softer,

cushioning effect. In the front the upper part of the shock absorbers is attached directly to the upper control arm of the suspension unit while the bottom is attached to the lower control arm.

A ride stabilizer bar is utilized to keep the car level when rounding curves.

A change in the camshaft, causing the intake valves to open eight degrees sooner than before, has given DeSoto's high compression engine faster acceleration and better performance. The engine, entirely new last year, retains its original features. It is an L-head, six-cylinder engine with a compression ratio of 6.5 to 1, developing 93 hp. at 3600 r.p.m. It has a bore of 3 $\frac{3}{8}$  in. and a stroke of 4 $\frac{1}{4}$  in., with a total piston displacement of 228.1 cu. in.

The use of rubber has been adopted this year in the mounting of the steering gear housing to the frame. This rubber insulation absorbs road shocks, keeping them from the driver's hands. It also minimizes wheel fight and jerk.

Important changes have also been made in the clutch and transmission. A new baffle plate prevents oil and water vapors from reaching the clutch driven disk surfaces while a new

grooved facing aids in cooling and breaking down vacuum.

Easy shifting is provided with the introduction of a new blocker-type synchronizer in the transmission that makes it almost impossible to clash gears. Improvements have also been made on DeSoto's gas saver transmission, available at slight extra cost.

Also included on the new DeSoto is a larger, air cooled generator with a capacity of 28 amperes to take care of the extra demands in modern motoring, such as heaters, radio, extra lights and the like.

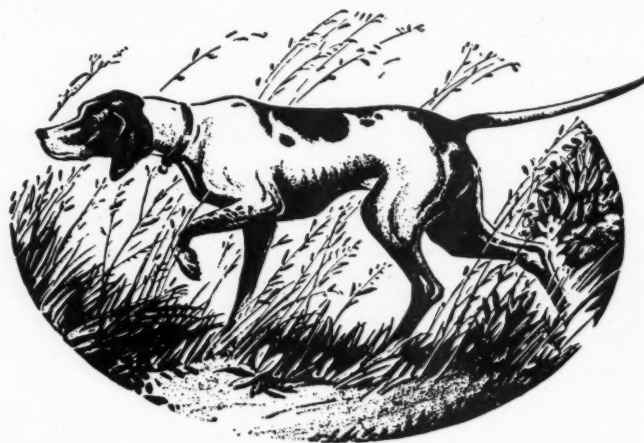
### Parts Assortment For Stromberg Carburetors

Bendix Products Corp., 401 Bendix Drive, South Bend, Ind., has announced a new steel cabinet containing parts to service all standard-equipment Stromberg carburetors since 1931. The complete stock of parts and the cabinet, with index system, carries a list price of \$310. The assortment of parts is such that it is guaranteed against obsolescence for 12 months. Slow moving parts are returnable for exchange.

# GREY-ROCK PROVIDES



**QUICK** —as a gazelle which scents danger.



**QUIET** —as a pointer sure of his bird.

**Grey-Rock**  
BALANCED BRAKSETS  
UNITED STATES ASBESTOS DIVISION  
of Raybestos-Manhattan, Inc., MANHEIM, PA.



## Chevrolet

(Continued from page 22)

3½ in. bore x 3¼ in. stroke, 216 cu. in. displacement, rated 85 hp. at 3200 r.p.m., with cast iron head and compression ratio of 6.25 to 1.

Among the salient refinements are the higher capacity valve springs, improved exhaust valve heat transfer, improved water pump and fan assembly, improved ignition distributor oil seal, more effective front end oil seal, better camshaft bearing lubrication, improved carburetor balancing vent system, and more durable cooling system thermostat.

In addition to the foregoing, the water jacketing is extended further down along the valve guides, and the coring is re-shaped to obtain more uniform volume of water around it.

Ample capacity for loads imposed by accessories is assured by the new higher-capacity generator, of the fixed third-brush type, with an average maximum output of 28 amperes as compared with 19½ in the regular 1937 generator. Better generator cooling fan of greater depth. A voltage regulator has been added, and also an easily-removed battery cover with tight seal.

The Starterator has been replaced by the starting mechanism similar to that used on the higher-priced General Motors cars, incorporating starter pinion mounted on a splined shaft in combination with an over-running clutch.

Rear axle refinements include a tread of 59 in., increased axle shaft diameter, and heavier housing wall at the spring seats. Rear springs now are completely insulated from the axle by using rubber mounts in the housing brackets.

Brake system remains unchanged but features a new handbrake of the oscillating sector type with reversed release grip.

Master models follow the same specification features as the Master Deluxe with basic differences in certain mechanical features; also some modifications in styling and interior treatment. As before, the Master line includes all of the body types except the sport coupe, and again includes the cabriolet and sedan delivery. Chassis features are identical with the Deluxe except in the use of conventional I-beam front axle with semi-elliptic front springs on the Master. Other differences include shock-proof tie-rod, higher speed axle, and box-girder frame modifications.

## Plymouth

(Continued from page 33)

used in former types of shock absorbers.

Plymouth's six-cylinder, L-head engine also is carried over in the 1938 model with some refinements. The fuel pump is strengthened, with capacity increased from 140 pints per hour to 165 pints per hour. It drives fuel up to the carburetor under increased pressure, and helps prevent "vapor lock" in extremely hot climates.

The whole chassis is better sealed to keep oil in, and keep dirt out, with fewer places to lubricate. The engine develops 82 hp. with a compression ratio of 6.7 to 1.

### Perfection Circulars

The Perfection Steel Body Co., Galion, Ohio, has recently issued three new circulars pertaining to their hoists and bodies for light duty trucks. Each circular contains complete information regarding their hydraulic hoist, its mounting and operation, and the various styles of dump bodies that are available for light duty trucks.

# EVERYTHING for Your Profit



**SMOOTH**—as a fox stalking a rabbit.



**LONG WEARING**

—as a rhinoceros's horny hide.

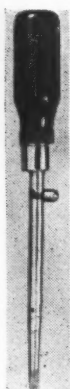
**YES, GREY-ROCK PROVIDES EVERYTHING FOR YOUR PROFIT**

Sure-footed control which you'll sense in the first car you reline with Balanced Braksets. Convenient sets developed, manufactured, certified and packaged for all cars—backed by a corporation with products on 9 out of 10 cars. Complete service instructions. Year-round merchandising program. Honestly priced for customer satisfaction and your profit. Yes, Grey-Rock has everything. See your jobber.



**Concrete Umbrella** The latest provision for the comfort of Bombay police on traffic duty is this concrete sunshade to protect the officer from the burning rays of the sun.

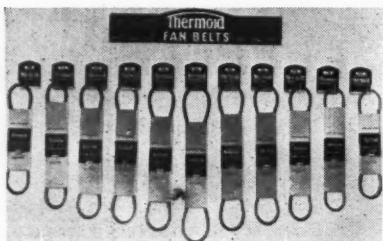
### Stromberg Has New Grip-Point Screw Driver



One of the latest developments of the Stromberg Motoscope Corp., 2701 Belmont Ave., Chicago, Ill., is their Grip-Point screw driver. This new tool, while it can be used as an ordinary screw driver, is equipped with a lever in the shank of the tool which ejects a grip-point in the end to make a firm contact in the slot of the screw and hold it on the end of the screw driver. This eliminates the use of two hands to "start" the screw, and also permits the insertion of screws in inaccessible places.

### Free Fan Belt Hooks

Thermoid Rubber Co., P. O. Box 1041, Trenton, N. J., is supplying free hooks and fan belt signs to serve the practical purpose of stocking a supply of fan belts and at the same time



keep them before every customer. The hooks are unusually large, and will accommodate 8 or 10 belts, providing ample stock and a neat display.

### The Round Fat Ones

#### Go Farther

Discovery of the fact that gasoline made up of round, fat molecules is far more efficient than that in which the molecules are long and thin may make possible automobiles with smaller engines and operating more miles per gallon.

According to statements of W. G. Lovell and J. M. Campbell of the General Motors Research Laboratories in a paper presented before the American Chemical Society at Rochester, N. Y., extensive chemical experiments have proved that the shape of the molecule has a direct bearing on the size of your gasoline bill and the kind of car you buy.

Why the shape of the molecule makes this difference is quite simple, the research men pointed out. Automotive engineers have long known that if they increase the compression ratio of an engine, they got more power out of it on less gasoline. But when they tried it, they found that the engine would knock on the available gasolines.

It was found that not all gasolines were alike in this respect. Some were better than others. Chemical research has found out why. It is because of the shape of the molecules in the gasoline. If the molecule has a long, stringy shape it knocks badly; but if a molecule of the same size is arranged compactly, more like a ball, then it makes a fine fuel. The difference between these two types of molecules is so great that a fuel made of one may give fifty per cent more power in a suitable engine than another. True, both would give the same amount of heat, in an oil furnace for instance, but because one may be burned in an engine with higher compression ratio, without knock, it will give much more power there.

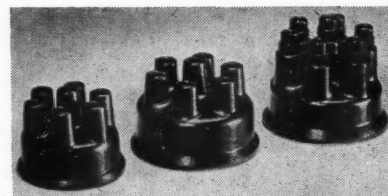
So far these super fuels have been mostly made in the laboratory in glass flasks only. They are too expensive for general use, although fuels of 100 octane number (regular-grade gasoline runs around 70 octane number) are now "tailor-made" to fit airplane engines where the duty is very severe. Research has shown what kind of fuel molecules to make, but it has not yet shown just how to make such compounds out of nature's raw

material—which is petroleum—cheaply enough.

While the end is not yet definitely in sight, research men know what they are looking for and they know that chemical research may produce commercial super fuels which will make possible automobiles with smaller engines and with more miles per gallon. It is all a matter of controlling the shape of molecules.

### Heavy-Duty Distributor Caps

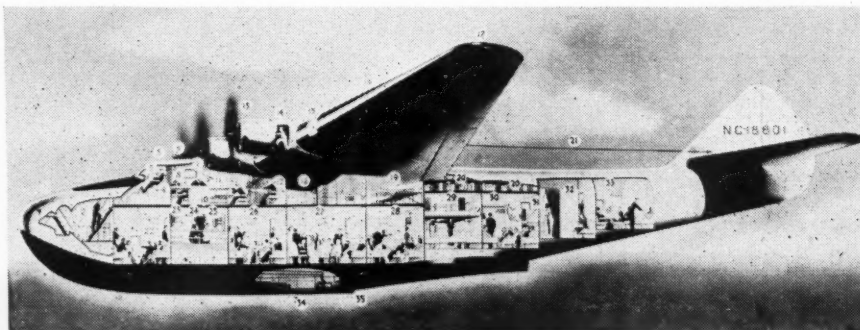
The Delco-Remy Division of General Motors Corporation, Anderson, Ind., has announced three special heavy-duty distributor caps which may be used to replace the original caps in numerous applications where severe operating conditions exist. These caps are molded from "XM-



1000," a new insulating material which is said to have a very high dielectric strength and the ability to withstand great heat as well as wide variations of temperature without cracking or breaking down. The three caps, No. 1853240, No. 1867722, and No. 1842714, are available through authorized United Motors Service Stations.

### Ford Builds at Vancouver

Contract for the construction of the Ford Motor Company of Canada, Ltd., assembly plant at Vancouver, B. C., has been awarded to Smith Bros. & Wilson at a price of \$291,650 and construction will start immediately. The total cost of the project will be approximately \$550,000. The steel contract was awarded to the Dominion Bridge Company, Ltd., for \$96,000, and electrical and heating contracts have yet to be announced. Cost of assembly equipment will be added to construction total. It is planned to make the Vancouver assembly plant the most modern on the continent.



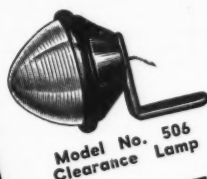
**Airliner** A photo-diagram of one of the six giant flying boats now nearing completion at the Boeing plant for Pan-American Airways for passenger service across the Atlantic Ocean. Accommodations for 50 passengers is provided for. Included are private cabins, dining lounge and sleeping compartments. Each ship will weigh 42½ tons fully loaded, and four Wright engines of 1500 hp. each. The airliner will have a top speed of 200 miles an hour, a cruising radius of 3200 miles.



# SAFETY LIGHTING

EVERY DAY CAN BE "SHOW DAY" FOR YOU

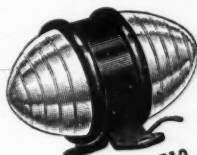
K-D LAMPS do duty every day in the year . . . day and night . . . they're usually AHEAD of the procession and do things no other lamp line dare claim. Your SAFEST bet for SAFETY.



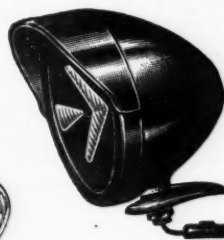
Model No. 506 Clearance Lamp



Model No. 326 TRIFLEX Reflector



Model No. 510 Double Marker Light



K-D SHO-TURN 6 types



K-D THE MASTER Fog Lamp

THE K-D LAMP CO., CINCINNATI, O.

Write for new catalog just off the press, and copyrighted I.C.C. illustrated chart of regulations.

## General Motors Parade of Progress

Nearly two million people in 18 states have seen such marvels as eggs fried on a "cold stove," music carried by light beams and many other phenomena indicating future trends of living which are revealed in the General Motors Parade of Progress, a gigantic exhibition of scientific development now traveling the nation in a two-mile caravan of motor trucks.

Transportation of this giant show from town to town requires a fleet of 28 trucks, 13 of which are huge exposition trucks, specially built for the purpose by the General Motors Truck Division. In these big GMC trucks

ride the permanent exhibits designed by General Motors to show the contrast between the old America and the new.

Unlike other traveling shows, the caravan moves and operates with military precision. After the trucks have pulled into position on the exposition lot, side panels are dropped immediately converting them into display windows.

A vast amount of equipment is required to stage the Parade of Progress, which, incidentally requires the services of a traveling staff of 50 persons. For example, the huge canvas "Big Top," metal coated to permit an audience of more than 1,000 to enjoy day time motion pictures, alone requires the services of a huge GMC tractor-trailer unit.

One exhibition unit which always draws a big crowd is the Diesel-electric power plant which lights the exhibits and furnishes the power for motion picture projectors. So great is the interest in this type of power that the trailer, in which the Winton-Diesel unit and generator rides, is equipped with drop panels transforming it into a permanent exhibit when the caravan is on location.

When the caravan takes the road, every precaution is taken for safe driving. Powerful air brakes, navigation lights, dual rear-vision mirrors and illuminated directional arrows assist drivers to travel safely. Intervals of several hundred feet are maintained between trucks, as a safety measure and a courtesy to passing motorists.

The General Motors Parade of Progress is now on its second tour of America. The itinerary this year started in Florida, continued westward through Texas to San Diego, California, then north along the coast to Oregon and Washington. The caravan will proceed as far north as British Columbia, then swing back down the coast, arriving in Texas by the first of next year. Eventually it will have visited every state.

### Rusco Appoints Sullivan and Howie

Following the recent death of Mr. Gerrard, the Russell Mfg. Co., makers of Rusco brake lining, has appointed Mr. Leo S. Sullivan as field sales manager and Mr. John R. Howe, as business manager.



# Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-d. Sed. (Divd.)	Wheelbase (In.)	Tire Size (In.)	ENGINE																	CHASSIS						
					No. of Cylinders, Bore and Stroke	Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake HP. at Specified R.P.M.	Compression Ratio (to-1).	Displacement Factor §	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Type and Make	Gearset Make	Universals Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension		
1	Bantam.....60	439	75	5.00/15	4-2.2x3.0	7.75	45.6	19-4000	7.00	....	Al	Own	Ala	No	No	Til	Buf	A	Wil	P.Ro	WG	Nb-UP	½ Spl	5.87	Tr			
2	Buick.....38-40	1022	122	6.50/16	8-3 ⅜x4 ⅜	30.6	248.0	107-3400	6.15	38.8	CI	LB	Ala	No	AC	SM	Wal	D	Del	P.Own	Own	m-Spi	½ Own	4.40	IC			
3	Buick.....38-60	1297	126	7.00/15	8-3 ⅜x4 ⅜	37.8	320.2	141-3600	6.35	42.3	CI	LB	Ala	No	AC	SM	Wal	D	Del	P.Own	Own	m-Spi	½ Own	3.90	IC			
4	Buick.....38-80	1645	133	7.00/16	8-3 ⅜x4 ⅜	37.8	320.2	141-3600	6.35	39.3	CI	LB	Ala	No	AC	SM	Wal	D	Del	P.Own	Own	m-Spi	½ Own	4.18	IC			
5	Buick.....38-90	2177	140	7.50/16	8-3 ⅜x4 ⅜	37.8	320.2	141-3600	6.35	....	CI	LB	No	AC	AC	SM	Wal	D	Del	P.Own	Own	m-Spi	½ Own	4.55	IC			
6	Cadillac.....V8-38-60	2085	127	7.00/16	8-3 ⅜x4 ⅜	39.2	346.0	135-3400	6.25	....	CI	Mor	Ala	No	AC	Str	Wal	D	Del	P.Long	Own	Nb-Mec	½ Own	3.92	IC			
7	Cadillac.....V8-38-65	2285	132	7.50/16	8-3 ⅜x4 ⅜	39.2	346.0	135-3400	6.25	....	CI	Mor	Ala	No	AC	Str	Wal	D	Del	P.Long	Own	Nb-Mec	½ Own	4.58	IC			
8	Cadillac.....V8-38-75	3075	141	7.50/16	8-3 ⅜x4 ⅜	39.2	346.0	140-3400	6.70	....	CI	Mor	Ala	No	AC	Str	Wal	D	Del	P.Long	Own	Nb-Mec	½ Own	4.58	IC			
9	Cadillac.....16-38-90	5135	141	7.50/16	16-3 ⅜x3 ⅜	67.6	431.0	185-3600	7.00	....	CI	Mor	Ala	No	AC	Car	Own	D	D	P.Long	Own	Nb-Mec	½ Own	4.31	IC			
10	Chevrolet.....Master	730	112¼	6.00/16	6-3 ⅜x3 ⅜	29.4	216.5	85-3200	6.25	35.7	CI	Own	CI	No	AC	Car	Own	D	D	P.Own	Own	m-Own	½ Own	3.72	C			
11	Chevrolet.....Mas.DeL.	796	112¼	6.00/16	6-3 ⅜x3 ⅜	29.4	216.5	85-3200	6.25	39.4	CI	Own	CI	No	AC	Car	Own	D	D	P.Own	Own	m-Own	½ Own	4.22	IC			
12	Chrysler...Roy. C-18	995	119	6.25/16	6-3 ⅜x4 ⅜	27.3	241.5	95-3600	6.20	....	CI°	Mor	Ala	Pur	BA	Car	NS	A	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC			
13	Chrysler...Imp. C-19	1191	125	6.50/16	8-3 ⅜x4 ⅜	33.8	298.6	110-3400	6.20	....	CI°	Mor	Ala	Pur	AC	Str	NS	A	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC			
14	Chrysler...Cus.Im.C-20	2295	144	7.50/16	8-3 ⅜x4 ⅜	33.8	323.5	130-3400	6.50	....	Al	Mor	Ala	Pur	AC	Str	NS	A	Wil	P.B&B	WG	Nb-UP	½ Own	4.55	IC			
15	De Soto.....S-5	958	119	6.00/16	6-3 ⅜x4 ⅜	27.3	228.1	93-3600	6.50	37.8	CI°	Mor	Ala	Pur	AC	Car	NS	A	Wil	P.B&B	Own	Nb-UP	¼ Own	4.10	IC			
16	Dodge.....Six	898	115	6.00/16	6-3 ⅜x4 ⅜	25.3	217.8	87-3600	6.50	38.0	CI	Mor	Als	Pur	AC	Str	NS	A	Wil	P.B&B	Own	Nb-UP	¼ Own	4.10	C			
17	Ford.....V8-60	6851	112	5.50/16	8-2.6x3.2	21.6	136.0	60-4200	6.60	....	Al	Gear	CS	No	Yes	Str	Own	O	Own	P.....	Own	m-Spi	¾ Own	4.44	Tr			
18	Ford.....V8-85	7101	112	6.00/16	8-3 ⅜x3 ⅜	30.0	221.0	85-3800	6.12	....	Al	Gear	CS	No	Yes	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	3.78	Tr			
19	Graham.....Special	1155	120	6.00/16	6-3 ⅜x4 ⅜	25.3	217.8	90-3600	6.70	....	Al	LB	Als	Fram	Bur	Mar	Old	D	Wil	P.Long	WG	Nb-UP	½ Spl	4.27	C			
20	Graham...Super Ch.	1290	120	6.50/16	6-3 ⅜x4 ⅜	25.3	217.8	116-4000	6.70	....	Al	LB	Als	Fram	Bur	Mar	Old	D	Wil	P.Long	WG	Nb-UP	½ Spl	4.27	C			
21	Hudson-Terrap...81	881	117	6.00/16	6-3x5	21.6	212.0	96-3900	6.25	37.3	CI	GED	Al	No	AC	Car	Old	A	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C			
22	Hudson-Terrap...82	950	117	6.00/16	6-3x5	21.6	212.0	101-4000	6.25	36.6	CI	GED	Al	No	AC	Car	Old	A	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C			
23	Hudson, 6.....83	1020	122	6.00/16	6-3x5	21.6	212.0	101-4000	6.25	35.9	CI	GED	Al	No	AC	Car	Old	A	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C			
24	Hudson.....8, 84, 5, 7	1095	122, 129	6.50/16	8-3x4	28.8	254.5	122-4200	6.25	40.4	CI	GED	Al	No	AC	Car	Old	A	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C			
25	Hupmobile Six.....E	1180	122	6.25/16	6-3 ⅜x4 ⅜	29.4	245.3	101-3600	5.75	41.8	CI	Mor	Als	No	AC	Car	.....	.....	Wil	P.....	WG	Nb-Spi	½ Own	4.54	C			
26	Hupmobile Eight...H	1325	125	6.50/16	8-3 ⅜x4 ⅜	32.5	303.2	120-3600	5.80	....	CI	Mor	Als	No	AC	Car	.....	.....	Wil	P.....	WG	Nb-Spi	½ Own	4.54	C			
27	La Salle.....V8, 38-50	1380	124	7.00/16	8-3 ⅜x4 ⅜	36.4	322.0	125-3400	6.25	40.7	CI	Mor	Ala	No	AC	Car	Wal	D	Del	P.Long	Own	Nb-Mec	½ Own	3.92	IC			
28	Lincoln.....V12	136-145	125	7.50/17	12-3 ⅜x4 ⅜	46.8	414.0	150-.....	6.38	....	Al	Ch	Al	Pur	AC	Str	Own	O	Exi	P.Long	Own	m-Spi	FF Tim	4.58	C			
29	Lincoln-Zephyr.....	1375	125	7.00/16	12-2 ¾x3 ¾	36.3	267.0	110-3800	6.70	....	Al	Ge	Al	CSA	AC	Str	Own	O	Own	P.....	Own	m-Spi	¾ Own	4.44	Tr			
30	Nash Lafayette.....3810	850	117	6.00/16	6-3 ⅜x4 ⅜	27.3	234.8	95-3400	5.83	38.4	CI	Whit	Als	No	AC	Str	Wal	A	USL	P.B&B	Own	Nb-Mec	½ Own	4.11	C			
31	Nash.....Amb. 6, 3820	1050	121	6.25/16	6-3 ⅜x4 ⅜	27.3	234.8	105-3400	6.00	....	CI	Whit	Als	BS	AC	Mar	Wal	A	USL	P.B&B	Own	Nb-Mec	½ Own	4.11	C			
32	Nash.....Amb. 8, 3880	1200	125	7.00/16	8-3 ⅜x4 ⅜	31.2	260.8	115-3400	6.00	....	CI	Dia	Als	BS	Bur	Str	Wal	A	USL	P.B&B	Own	Nb-Mec	½ Own	4.10	C			
33	Oldsmobile.....38	967	117	6.50/16	6-3 ⅜x4 ⅜	28.4	229.7	95-3400	6.10	38.4	CI	Whit	Al-O	No	AC	Car	Var	D	D	P.B&B	Own	Nb-Mec	½ Own	4.37	IC			
34	Oldsmobile.....38	1078	124	7.00/16	8-3 ⅜x4 ⅜	33.8	257.1	110-3600	6.20	41.7	CI	LB	Al-O	No	AC	Car	Var	D	D	P.B&B	Own	Nb-Mec	½ Own	4.37	IC			
35	Packard Six.....1600	1175	122	6.50/16	6-3 ⅜x4 ⅜	28.3	245.3	100-3600	6.52	40.0	CI	Mor	Als	No	AC	CG	Old	D	Wil	P.....	Own	Nb-Mec	½ Own	4.54	IC			
36	Packard Eight.1601, 2	1325	127, 48	7.00/16	8-3 ⅜x4 ⅜	33.8	282.0	120-3800	6.60	41.4	Al	Mor	Als	No	AC	SC	Old	A	PD	P.....	Own	Nb-UP	½ Own	(a) 4.1	IC			
37	Pack. Sup. 8. 1603.4, 5	2790	127-34-39	7.50/16	8-3 ⅜x5	32.5	320.0	130-3200	6.50	41.6	Al	Mor	Als	Pur	AC	Str	Old	A	PD	P.....	Own	Nb-UP	½ Own	4.69	IC			
38	Pack. Twelve. 1607, 8	4155	134, 39	8.25/16	12-3 ⅜x4 ⅜	56.7	473.0	175-3200	6.40	45.3	Al	Mor	Als	Pur	AC	Str	Old	A	PD	P.....	Own	Nb-UP	½ Own	4.41	IC			
39	Pierce-Arrow.....1801	130-147	117	7.00/17	8-3 ⅜x5	39.2	385.0	150-3400	6.40	37.6	Al	Whit	Als	Pur	AC	Str	Buf	DO†	Wil	P.Long	WG	Nb-UP	½ Own	4.58	C			
40	Pierce-Arrow.....1802	138-144	117	7.50/17	12-3 ⅜x4	58.8	462.0	185-3400	6.40	42.0	Al	Whit	Als	Pur	AC	Str	Buf	DO†	Wil	P.Long	WG	Nb-UP	½ Own	4.58	C			
41	Pierce-Arrow.....1803	147	117	7.50/17	12-3 ⅜x4	58.8	462.0	185-3400	6.40	40.7	Al	Whit	Als	Pur	AC	Str	Buf	DO†	Wil	P.Long	WG	Nb-UP	½ Own	4.58	C			
42	Plymouth.....P5	730	112	5.50/16	6-3 ⅜x4 ⅜	23.4	201.3	82-3600	6.70	36.4	CI°	Mor	Ala	No	BA	BC	NS	A	Wil	P.B&B	Own	Nb-Mec	½ Own	3.90	C			
43	Plymouth.....P6	803	112	6.00/16	6-3 ⅜x4 ⅜	23.4	201.3	82-3600	6.70	36.3	CI°	Mor	Ala	No	BA	BC	NS	A	Wil	P.B&B	Own	Nb-Mec	½ Own	4.10	C			
44	Pontiac 6.....38-26DA	916	117	6.00/16	6-3 ⅜x4	28.3	222.7	85-3520	6.20	37.4	CI	Mor	CHI	No	AC	Car	BH	D	Del	P.Own	Own	Nb-Mec	½ Own	4.37	IC			
45	Pontiac 8.....38-28DA	980	122	6.50/16	8-3 ⅜x3 ⅜	33.8	248.9	100-3700	6.20	40.0	CI	Mor	CHI	No	AC	Car	Buf	D	Del	P.Own	Own	Nb-Mec	½ Own	4.37	IC			
46	Stude. Six & Com....	995	116½	6.00/16	6-3 ⅜x4 ⅜	26.3	226.0	90-3400	6.00	....	CI	Dia	Ly	Fram	AC	Str	Buf	A	Wil	P.B&B	WG	Ru-Th	½ Spl	4.55	IT			
47	Studebaker. Pres. 4C	1195	122	6.50/16	8-3 ⅜x4 ⅜	30.0	250.4	110-3600	6.00	....	CI	Dia	Ly	Fram	AC	Str	Buf	D	Wil	P.Long	WG	Nb-Spi	½ Spl	4.55	IT			
48	Willys.....38	573	100	5.50/16	4-3 ⅜x4 ⅜	15.6	134.2	48-3200	5.70	....	CI°	LB	CI	No	AC	Til	Buf	A	USL	P.R-B	WG	m-UP	½ Own	4.30	C			

## ABBREVIATIONS—General

○—Others also  
 \*—Measured on rim of Flywheel  
 1/2—Semi-floating  
 3/2—Three-quarter floating  
 ††—With clearance of .015 the valve is .004 off its seat.  
 ‡—Does not include Federal Taxes  
 §—Computed on basis of displacement, gear ratio, effective tire diameter, and weight with normal load.

(a)—(1/4 to +1/2)  
 A—Above (rods removed from)  
 A—After top center  
 AA—Automatic adjuster  
 Ad—Advanced  
 Al—Aluminum  
 Ala—Aluminum, Anode processed  
 Als—Aluminum with struts  
 Au—Automatic (b)—0 to +1/2  
 B—Below (rods removed from)  
 B—Before top center  
 Bm—Before marks on vibration damper

(c)—1-1/2, 1-3/4  
 C—Conventional  
 C—Cold (Tappet clearance)  
 Ch—Chain  
 CHI—Chrome Nickel Iron  
 CI—Cast Iron CS—Cast Steel  
 dp—Double plate clutch  
 (e)—60, 4°51'; 65, 5°38'  
 (f)—60-1660, 65-2090  
 F—Floating (Piston Pin)  
 FF—Full floating  
 (g)—60, 155X; 65, 170X  
 (h)—70-25, 5, 75-2815

H—Hot (tappet clearance)  
 (i)—2445-2860 IC—Independent coil  
 IT—Independent Transverse  
 (j)—2960-3375  
 (k)—Intake, .0125—Exhaust, .0156  
 Ly—Lynite  
 m—Metal  
 M—Mechanical  
 N—Negative  
 (n)—Intake, .0124—Exhaust, .0156  
 Nb—Needle bearing  
 P—Piston (Pin Locked in)  
 P—Single plate clutch

PH—Power operated, hydraulic brakes R—Rod (Pin locked in)  
 (r)—Out only Ru—Rubber  
 (s)—2 door sedan 5.25/17, 4 door sedan 6.00/16  
 (t)—60, 7.00/16; 65, 7.50/16  
 TC—Top Center  
 Tr—Transverse Tu—Tubular  
 (u)—60, 3.69; 65, 4.30  
 (v)—70, 4.30; 75, 4.60  
 Var—Various  
 x—At 1000 R.P.M.  
 y—At 2800 R.P.M.



**Car Manufacturers and Supersede All Others Previously Published**

**MAKES OF UNITS**  
 †Owen-Dyneto for Generator and Starter  
 A—Autolite  
 AC—AC Spark Plug Co.  
 BA—Burgess or AC  
 B&B—Borg and Beek  
 BH—Bendix, Hydraulic  
 BM—Bendix, Mechanical  
 BO—Buffalo or Oldberg  
 BPH—Bendix, power operated,  
 hydraulic

BS—Briggs & Stratton  
Buf—Buffalo Pressed Steel  
Bur—Burgess Car—Carter  
CG—Chandler-Groves  
Ch—Champion  
Col—Columbia  
D—Delco-Remy  
DA—Delco-Remy Generator and Starter,  
Autolite Coil and Distributor  
Del—Delco  
DL—Continental Diamond Fiber  
DL—Detroit Lubricator

**Det**—Detroit      **Exi**—Exide  
**F-O**—Float-O      **G**—Gemmer  
**Ge**—General Electric Co.  
**Han**—Handy  
**HM**—Bendix hydraulic and mechanical combined  
**Ill**—Illinois  
**La**—Lavine  
**LB**—Link Belt  
**LH**—Lockheed hydraulic  
**Mar**—Marvel      **Mec**—Mechanics  
**Mor**—Morse Chain Co.

**Nat**—National  
**NS**—Noblitt Sparks  
**O**—Own  
**OH**—Own hydraulic  
**Old**—Oldberg  
**OM**—Own, mechanical  
**OP**—Own, power operated  
**OS**—Own, semi-centrifugal  
**PD**—Presto-Lite or Delco  
**Pur**—Purolator  
**R-B**—Rockford with Borg & Beek disk  
**R**—Ross  
**Ro**—Rockford

S—Saginaw  
SC—Stromberg or Carter  
SM—Stromberg or Marvel  
Spi—Spicer Ste—Stewart-Warner  
Str—Stromberg  
Th—The Thompson Products  
Til—Tillotson Tim—Timken  
UP—Universal Products  
Wal—Walker  
WG—Warner Gear  
Whit—Whitney Wil—Willard  
(z)—Or Champion

## Motor Car Price, Weight and Body Table

*Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford and Lincoln. Optional equipment, state or local taxes, transportation charges and finance charges are extra.*

BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight
<b>BANTAM</b>			<b>CHEVROLET (Cont.)</b>			<b>GRAHAM</b>			<b>LA SALLE</b>			<b>PACKARD</b>			<b>PIERCE- ARROW (Cont.)</b>		
Pick-up Panel	465		Master De Luxe Sedan, 4d.	796	2935	Standard Coupe	995		Series 38-50 Conv. Coupe	1415		Six-1600 Tour. Sedan, 4d.	1175	3525	Brunn Town Bro. Conv. Sedan		
Bus. Coupe	439		Coach, 2d.	730	2910	Comb. Coupe Sedan, 4d.	1045		Conv. Sedan	1820		Tour. Sedan, 2d.	1145	3475			
Std. Coupe	469		Tn. Sed., Trk., 2d.	750	2935		1065		Coupe	1300		Club Coupe	1120	3425	Twelve 1803 Sedan		
Roadster	479		Spt.Sed.,Trk.,4d.	817	2960	Special Bus. Coupe	1095		Tour. Sedan, 2d.	1340		Conv. Cpe., 2-4p.	1235	3500	Enc. Dr. Lim.		
			Bus. Coupe, 2d.	714	2840	Comb. Coupe Sedan, 4d.	1135		Tour. Sedan, 4d.	1380		Business Coupe Chassis	1075	3450			
			Sport Coupe, 2d.	750	2880		1155										
<b>BUICK</b>			<b>CHRYSLER</b>			<b>HUDSON</b>			<b>LINCOLN</b>			<b>Eight-1601</b>			<b>PLYMOUTH</b>		
Special 49			Royal Six Bus. Coupe, 2d.	918		Supercharger Bus. Coupe	1230		V12—136 in. Conv. Roadster	wb.		Tour. Sedan, 4d.	1325	3650	Six P5 Coupe, 2d.	645	2710
Sport Sedan, 2d	981	3515	Conv. Coupe	963		Comb. Coupe Sedan, 4d.	1270		Coupe			Tour. Sedan, 2d.	1295	3600	Sedan, 2d.	685	2760
Sport Sedan, 4d.	1006	3520					1290		Wilby Coupe			Club Coupe	1270	3550	Sedan, 4d.	730	2790
Sport Sedan, 4d.	1022	3535							Sedan, 4d.			Conv. Cpe., 2-4p.	1365	3625			
Tour. Sedan, 4d.	1047	3560							Brunn Vict.			Conv. Sedan	1650	3775			
Bus. Coupe, 2d.	945	3385										Bus. Coupe	1225	3570			
Sport Coupe, 2d.	1001	3425										Chassis	960	2620			
Conv. Coupe, 2d.	1103	3575															
Conv. Phae., 4d.	1406	3705															
Century 69																	
Tour. Sedan, 2d.	1256	3760															
Sport Sedan, 4d.	1272	3785															
Tour. Sedan, 4d.	1237	3780															
Sport Coupe, 2d.	1223	3690															
Conv. Coupe, 2d.	1359	3815															
Conv. Phae. 4d.	1713																
Roadmaster 80																	
Phae., Conv., 4d	1983																
Tn. Trunk, 4d.	1645	4245															
For. Sed., Tk., 4d	1758																
Sport Sedan	1645	4245															
Limited 90																	
Tour. Sedan, 4d.	2350																
Lim. Trunk, 4d.	2453																
Tour. Sedan, 4d.	2176																
<b>CADILLAC</b>			<b>DE SOTO</b>			<b>NASH</b>			<b>LINCOLN-ZEPHYR</b>			<b>Super-Eight-1604</b>			<b>PONTIAC</b>		
V8-Series 60			Bus. Coupe, 2d.	870	3039				Coupe, 3p, 2d.	1295		Formal Sedan	3710	4795	De Luxe Six		
*Tour. Sedan, 5p	2085		Coupe, rumb., 2d						3p, 2d.	1295		Tour. Sedan, 4d.	2995	4670	Coupe, 2-4p.	835	3180
			Brougham, 2d						Sedan, 2d.	1375		Club Sedan	2990	4600	Sedan, 2d.	865	3265
			Tour. Bro., 2d.	930	3119				Sedan, 2d.	1355		Coupe, 5p.	2965	4595	Sedan, 2d.	891	3200
			Sedan, 4d.	958	3134				Limousine, 4d.	1550		Coupe, 2-4p.	2925	4585	Sport Coupe, 2d	891	3265
			Tour. Sedan, 4d.	970	3139				Conv. Coupe	1650		Conv. Cpe., 2-4p.	3210	4580	Tour. Sedan, 2d.	891	3265
			Conv. Coupe	1045					Conv. Sedan	1790		Victoria	3670	4650	Cabriolet, 2d.	916	3285
			Conv. Sedan, 4d.	1375								Chassis	2170	3375	Sedan, 4d.	942	3285
			Sedan, 7p., 4d.	1195											Tour. Sedan, 4d.	1310	
			Limousine, 7p.	1285											Conv. Sedan		
V8-Series 75															De Luxe Eight		
Conv. Coupe, 2p	3380														Bus. Coupe, 2d.	898	3320
Conv. Sed., Trk.	3490														Sedan, 2d.	934	3395
Coupe, 2p.	3275														Sport Coupe, 2d.	955	3325
Coupe, 3-5p.	3380														Tour. Sedan, 2d.	960	3405
Town Sedan, 5p	3635														Cabriolet, 2d.	1057	
Tour. Sedan, 5p	3075														Tour. Sedan, 4d.	980	
Tour. Sedan	3155														Conv. Sedan, 4d.	1006	3420
Formal Sed., 5p	3990														Conv. Sedan	1353	
Formal Sed., 7p	3990																
Tour. Sedan, 7p	3205																
Livery Sed., 8p.	3105																
Im. Tr. Sed., 7p	3360																
Liv. Imp. Tr., 8p.	3255																
Town Car, 7p.	5115																
16-Series 90																	
Conv. Coupe	5440																
Conv. Sed., Trk.	6000																
Coupe, 2p.	5335																
Coupe, 5p.	5440																
Town Sedan	5895																
Touring Sedan	5135																
Tour. Sed., (Div.)	5215																
Formal Sed., 5p	6050																
Formal Sed., 7p	6050																
Tour. Sedan, 7p	5265																
Imp. Tr. Sed., 7d	5420																
Town Car, 7p.	7170																
<b>CHEVROLET</b>			<b>FORD</b>			<b>HUPMOBILE</b>			<b>OLDSMOBILE</b>			<b>PIERCE- ARROW</b>			<b>STUDEBAKER</b>		
Master Sedan, 4d.	730	2845	De Luxe V8-85			Six Sedan, 4d.	1180	3370	Six Bus. Coupe, 2d.	870	3205	Eight Model 1801			Six Bus. Coupe, 3p.	895	3060
Coach, 2d.	688	2800	Tudor Sedan	725		Del. Sed., 4d.	1222	3400	Club Coupe, 2d.	926	3195	Club Sedan			Cus. Coupe, 3 p.	920	3140
Twn.Sed.,Trk.,2d	689	2830	Fordor Sedan	685		Custom Sed., 4d.	1340	3440	Sedan, 2d.	916	3275	Coupe			Cruis. Sedan	985	3140
Spt. Sed., Trk., 4d	750	2885	Phaeton	820					Sedan, 4d.	941	3265	Conv. Roadster			Cruis. Sedan	995	3190
Bus. Coupe, 2d.	648	2770	Coupe, 5W	685					Cabriolet, 2d.	967	3290	Club Berline			Conv. Sedan	1345	
Cabriolet, 2d.	755	2790	Conv. Coupe	770								Formal Sedan			President Cus. Coupe	1120	3330
			Conv. Sedan	900								Sedan, 7 p.			Club Sedan	1185	3400
			Conv.Club Coupe	800								Enc. Dr. Lim.			Cruis. Sedan	1195	3450
			Club Coupe	745								Brunn Town Bro. Conv. Sedan			Conv. Sedan	1555	
												Sedan, 7p.					

•—5 Wheel Equipment

†—6 Wheel Equipment



# ASK ABOUT THE *New* Westinghouse Rectigon BATTERY CHARGER

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**T**HE NEW Westinghouse Rectigon Battery Charger is completely redesigned for highest efficiency. What's more, it will pay for itself in two weeks in your own station. We are ready to prove how our Battery Check-Up Plan will make this possible.

With the new Westinghouse Rectigon Free Battery Check-Up Plan you really get set up for battery charging and battery replacement business. Rectigon charging service, like any of your shop service facilities, must be merchandised and brought to the attention of your customers. Therefore, Rectigon offers you a sales plan and all the necessary advertising and selling tools Free.

With the FREE BATTERY CHECK-UP publicity material—window streamers, wall banners, you will announce your new service. And the battery check-up tags will remind your customers that their battery needs service. What's more, it will keep you in touch with the battery condition of your customers and give you the inside track for replacement battery sales.

Westinghouse Electric,  
East Pittsburgh, Pa.



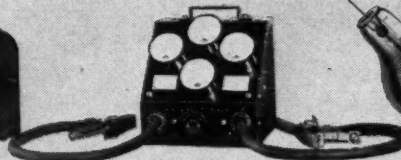
Sensational new FlexArc Midget Marvel A-C Welder. Ideal for small repair shops. Complete, ready to weld, with hood, electrodes and cable. Only \$123.50 COMPLETE.

## Westinghouse

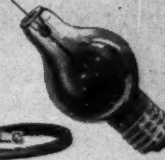
The Reminder of the Westinghouse "Free Battery Check-Up Plan" Locates Battery and Charging Prospects.



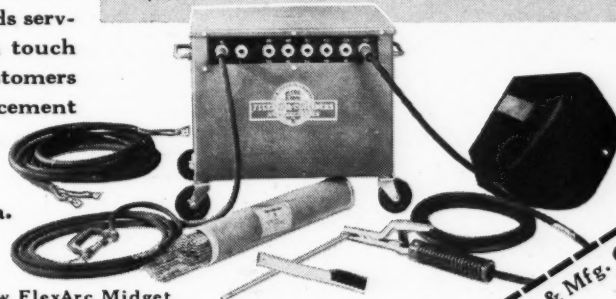
Available in wall and service unit types. Adjustable charging current. Six battery rectigon unit priced as low as \$36.00.



Rectigon Battery Testers show accurately condition of each cell under true load conditions. Wall and bench models.



Rectigon replacement bulbs customarily exceed the guarantee of 1200 hours. Six ampere bulb at a new low price of \$6.00.



Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.  
Dept. 7N

Please send me full information on your:  
☐ Battery Check-Up Plan.  
☐ Proof that it "Pays for Itself in 2 Weeks."  
☐ Midget Marvel Welder.

## Cadillac-La Salle

(Continued from page 21)

the LaSalle, more accurate calibration of fuel-air ratio is accomplished by nozzle changes which improve engine "feel" at part throttle.

On the Stromberg carburetor, a vacuum actuated economizer is used instead of the former throttle-operated economizer. This makes possible leaner mixture for light load operation since the mixture is enriched whenever power is required even with small throttle opening.

All models use the single-plate Long semi-centrifugal clutch. On Cadillac V-8's, eight vibration dampening

springs are used instead of ten, so as to decrease spinning weight.

The new V-16 engine is V-16, L-head, with cylinders at 135 degrees. It is practically flat and is  $3\frac{1}{4}$  bore x  $3\frac{1}{4}$  in. stroke, 431 cu. in. displacement, rated 185 hp. at 3600 rpm. with 7.0 to 1 compression ratio. It is suspended in rubber at five points.

Like the V-8's, the V-16 is fitted with the hydraulic valve silencers. The block is a one-piece casting. Nine main bearings and five camshaft bearings are provided. Rubber torsional vibration dampener is used, but the flywheel is of conventional design instead of the special construction used on V-8's. Short, light rods are used with only two-inch crankpins,

permitting withdrawal of rods and pistons through the head. The wrist pin is locked in the rod.

To assure reliability and simplicity of service operations, the V-16 is fitted with dual accessories wherever possible, making it in effect two eight cylinder engines. For example, there are two eight-cylinder distributors, two coils, two carburetors, and two fuel pumps. A novelty for Cadillac is the use of two separate water pumps.

An unusual feature is the generator drive which is off the fan belt but permits of a higher generator speed by means of a friction drive for the generator. In this construction, the fan is driven by dual belts which also drive a shaft supported by double-row ball bearing to which is secured a drum containing a rubber driving ring contacting the generator driving wheel. The entire mechanism is supported by a bracket which may be raised or lowered to adjust the tension in the drive.

### Chassis Features

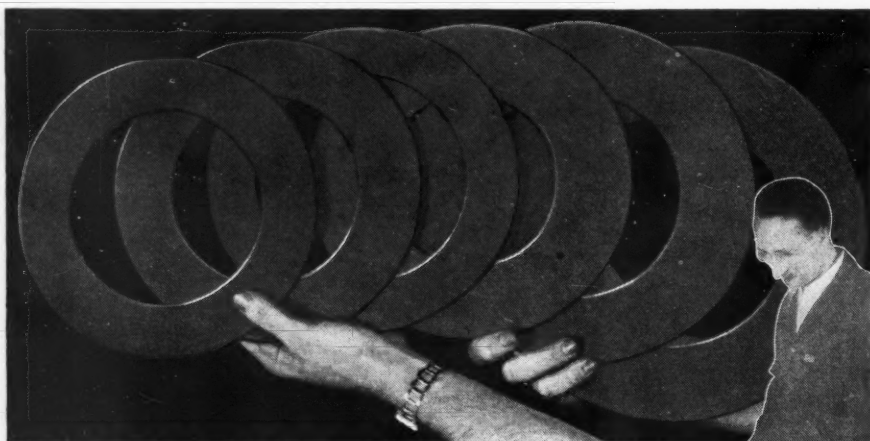
All Cadillac chassis have been redesigned with lower and torsionally stiffer frames, made possible by extending the hypoid axle through the entire line. With lower frames, the mufflers now are mounted transversely at the extreme rear. Spring liners are used on all models. Last year's LaSalle and Cadillac transmission has been provided with minor changes to increase its capacity for use on all cars including the V-16.

Perhaps the most interesting feature so far as the public is concerned is the adoption of remote transmission shifting—the Syncromatic control—standard on all cars.

The transmission control lever is now mounted upon the steering column and controls the shifting of the transmission gears through two concentrically nested torsion shafts and the necessary linkage. One of the torsions shafts controls high and intermediate gears and the other low and reverse. Sliding shifter shafts have been eliminated in favor of rotating shafts. From the driver's standpoint, the operation remains virtually unchanged. The same transmission now is used throughout, the only difference between LaSalle and Cadillac being the length of mainshaft and extension.

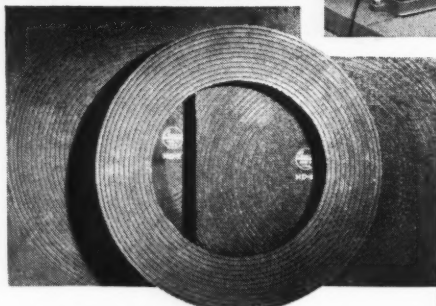
Series 60 frame differs from other models due to greater wheelbase, increased body width and lower body floor level. It is of double-drop construction and is three inches lower. Frames for other models have been increased in stiffness, the frame for the 90 being 100 per cent increased in torsional rigidity. The LaSalle remains unchanged.

A new hypoid axle is used for the Series 65, 75, and 90 cars, the former axle with some modifications being continued on the LaSalle and 60. Two mechanical changes characterize the larger axle-threaded sleeve adjustment for the differential side bearings, and the use of tapered roller pinion bearings separated by a sleeve, pre-loaded at assembly and shim-adjustable. Ring gear diameter is 11 in. In the smaller axle, pre-loaded Timken pinion shaft bearings are used with shim adjustments.



## SLAB STOCK FOR ODD-SIZE CLUTCH FACINGS

Something new! Now you can furnish practically any size clutch facing in a jiffy with AMCO Clutch Facing Slab Stock. Comes flat in eight numbers out of which you can cut 213 different size facings for cars, trucks and tractors.



AMCO CLUTCH FACING SLAB STOCK and Facing Cut with SLABslitter

Keep a small assortment of AMCO Slab Stock on hand instead of a big stock of odd-size, slow-moving numbers. Win good will by your ability to furnish exactly the right item quickly. Material is genuine AMCO "Dreadnaught"—finest obtainable.

Write, wire or phone for size list, prices or samples. Will be demonstrated in Booths S-315-'17-'19 at ASI Show, Chicago.

## SLAB- slitter POWER SAW CUTS ANY SIZE

facing from AMCO Slab Stock. Fast, easy, accurate.  $\frac{1}{4}$  H.P. Electric Motor. Priced low—Pays out quick.



## ASBESTOS MANUFACTURING CO. HUNTINGTON, INDIANA





# *The* "STOP" SIGN *of Satisfaction*

Customer confidence and satisfaction, and all that they mean to good business, go hand in hand with the Chevrolet Plan for Independent Garagemen. It is a plan of proved results; a plan that attracts more business—and a plan that leads to bigger profits for garagemen who adopt it. The terms of this plan are extra attractive and include one of the most liberal parts offers ever made. Join the thousands of progressive Independent Garagemen who know from experience what the Chevrolet Plan means to their business. Get all the facts about it! Write for them today!

CHEVROLET MOTOR DIVISION  
General Motors Sales Corporation  
DETROIT, MICHIGAN



**CHEVROLET**  
HAS A BETTER DEAL FOR  
AN INDEPENDENT GARAGE-  
MAN IN YOUR COMMUNITY

*Will you get it?*

**MAIL  
THIS COUPON  
TODAY**

CHEVROLET MOTOR DIVISION, General Motors Sales Corporation  
Parts Merchandising Dept. 7B-11 • GENERAL MOTORS BLDG., DETROIT, MICH.

Gentlemen:

I am interested in the details of any proposition that will operate to increase the volume and profits gained from my business. Please send me, without obligation on my part, full information concerning the new 1938 Chevrolet Plan for Independent Garagemen.

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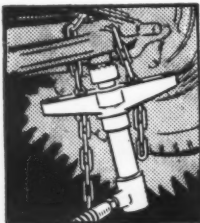
**\$5.99** *Porto-Power*  
**SPECIAL 99 DAY OFFER**  
**\$99**  
9107 DEALER NET ON WEST COAST  
 SLIGHTLY HIGHER IN CANADA

*It's a genuine*  
**PORTO-POWER**

You know about Blackhawk's famous Porto-Power — and its knack in handling body rebuilding, reconditioning, frame and axle straightening, and general shop jobs.

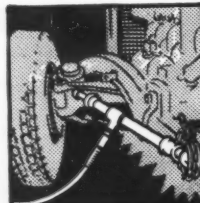
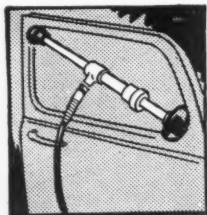
NOW comes your big chance to OWN one of these profit-making machines immediately! Porto-Power profits will more than cover your low-time payments.

**MODEL S-99** is the same basic "Workshop on Wheels" now used in 12,000 shops. 23 practical Porto attachments adapt 7-ton hydraulic power of all-directional, remotely-controlled ram to pulling, pushing, bending, clamping, spreading, pressing and twisting. Includes wheeled stand and convenient press.



(Above) Porto combination removes tight Ford perch bolt easily.

(Below) Flex-Heads conform to curves — push window frames into shape. Do not dent or mar.



(Above) Porto Ram and attachments align knee-action assemblies.

(Below) Porto Ram and extensions make quick work of spreading springs.



Write for FREE 3-day trial of S-99 in your shop. "Get next" to this big deal while it lasts!

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Exclusive Canadian Distributor:  
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 Branches in all Principal Cities

**BLACKHAWK**  
*Porto-Power*

## Hudson

(Continued from page 29)

Certain changes have been made in the design of the connecting-rod head, which is now more rigid, and, besides, it is machined to a finish after the cap has been assembled to it. The weight of the vibration damper on the engine crankshaft has been reduced and this is said to have minimized synchronous vibration and drumming within the body.

Changes made in the design of the ignition coil permit of satisfactory operation with a wider spark-plug gap, and it is now unnecessary to adjust or replace the plug until the gap width has become 0.040 in.

The clutches of all models have been enlarged and have additional springs. Formerly there were nine springs on the clutch of the Six and 12 on the clutch of the Eight. Now there are three additional springs on each model, these being nested in three of the regular springs.

Greater rigidity has been provided in the transmission by making the housing heavier, ribbing it at the bearing supports, and providing the shafts with involute instead of the former straight-sided splines. The lock ring on the second-speed mainshaft cup gear has been made heavier, and additional space is provided for deposits at the bottom of the transmission housings. A larger filler opening facilitates servicing.

To permit of the use of oversize tires without interference, the rear tread has been increased 1½ in. on all models, and the rear-axle design has been adapted to this increased tread.

The Hudson "radial safety control" is continued, with a stronger forged-steel torque arm and new synthetic rubber-and-cork oil seals on the spindles of the torque arm. The front-end stabilizer has been improved by increasing the length of its arms. This, however, does not apply to business models.

The electrical system has been revised to increase its safe output. The generator has third-brush control, modified to maintain a constant output at high speeds. An output of 25 amperes is available at all speeds. The size of the generator cooling fan has been increased. Voltage regulation is provided for on all except the Hudson Terraplane and the business models, on which it is optional at extra cost. Location of the battery in a ventilated compartment of the cowl, under the hood, which was introduced by Hudson last year, is continued. Records are said to show that in this location the frequency of need for water additions is greatly reduced.

## Nash

(Continued from page 31)

cylinder head on the two Ambassador series, is heated throughout its entire length by the water in the cooling system. Temperature of the entire fuel intake system is maintained within a uniformly narrow temperature range.

While all engines remain the same size as last year, increased power is claimed.

All three series of Nash cars for 1938 will be known as "the car with sea-legs." This is because they utilize new skyliner-type, double-acting hydraulic shock-absorbers.

Another of the developments to be found in the 1938 Nash cars is a vacuum gear-shift, the operating lever of which extends from the instrument panel to within a few inches of the right-hand position on the steering wheel. The lever can be operated by a flick of the fingers and it is said to assure perfect gear-shifting as well as an all-clear front floor. The shift, like conditioned air for winter driving, is an optional feature of the Nash cars, obtainable at slight additional cost.

The company also numbers among its developments a new sound-proofing method and substance for motor cars which is claimed to make these cars 25 per cent quieter.

This is the outcome of months of joint experimentation on the part of automotive and refrigeration engineers. The result is that all Nash cars are sound-proofed with sufficient of this compound to cut running noises 25 per cent.

The Nash for 1938 claims greater leg-room than ever and better weight distribution by moving the motor 3 in. forward. This, coupled with a slightly altered arrangement of the bulkhead, adds 2½ extra inches of leg-room in the front, and two extra inches in the rear compartment.

The complete Nash line for 1938 consists of the Ambassador Eight, which is available in five models and is built on a 125-in. wheelbase. The Ambassador Six, available in the same five models, which has a 121-in. wheelbase, and the LaFayette line, built on a 117-in. wheelbase, which comes in both DeLuxe and Master styles. The DeLuxe group has five models, the same as those that comprise the Ambassador lines, while the Master group has four (Cabriolet eliminated). The Master group differs from the DeLuxe group only in that it is a still lower-priced car without deluxe appointments.

The automatic cruising gear and the "NoRol" are optional features that are continued at extra cost.

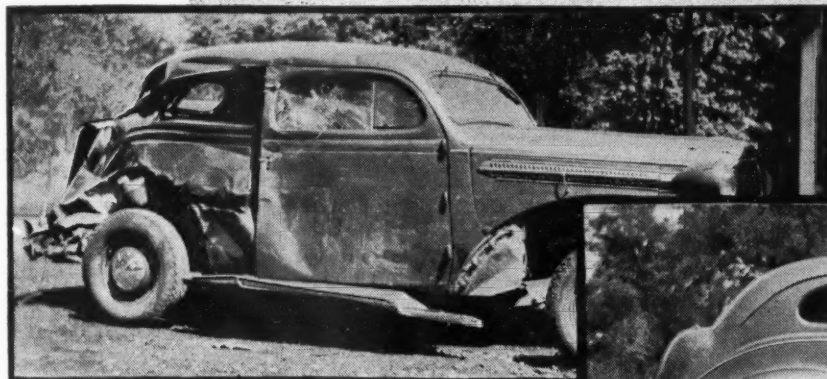


"Lady, you ain't got body squeaks—you got mice!"



# One "Dose" of Porto-Power

## cured this wreck



*Rx Porto  
every day  
Dr. Blackhawk*

**Model S-100**—Complete with 7-ton remote-control hydraulic ram—big 4 column press and 52 attachments. Dealer price only \$195.75. (Slightly higher on West Coast and in Canada.)



The "auto surgeon" in this case was Dudley Stamps of Lebanon, Kentucky. He sent in these pictures to show what he did with his Porto-Power. "Doctor" Stamps says his slogan is — "More Power with Porto-Power."

Another example of the thousands of Porto-Power owners who are cashing in on smash-ups. Statistics show that one out of every three cars is slated for some kind of a crack-up — from bashed in fenders to wrecks that will need plenty of Porto-Power "medicine."

With Porto-Power in your shop you can get your share of the cracked-up jobs to fix—and earn plenty of profit on each job. Porto-Power has everything you need for every job from smoothing out dented fenders to rebuilding major crack-ups. An important accessory to frame and axle work. Also does more general automotive shop jobs better and faster than you ever thought possible.

Ask your jobber salesman to demonstrate the S-100 Porto-Power — and explain his Time Purchase Plans. Send coupon for free book — "Cash In On Crack-Ups."

**BLACKHAWK MFG. CO., Dept. MA-11, Milwaukee, Wis.**

Exclusive Canadian Distributor:

**THE CANADIAN FAIRBANKS-MORSE CO., LTD.**  
Branches in all Principal Cities



**BLACKHAWK MFG. CO.**  
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Please send **FREE** book —  
"Cash In On Crack-Ups."

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**BLACKHAWK**

**Porto-Power**

## Protest Free Car Washing

Garage and service station operators of Kansas City are protesting against the recent growth in the number of stations offering car washing as a free service to customers. At present, more than twenty service stations in that city are offering free washes.

Appeals to curb this activity have been made by a joint committee of the Petroleum Retailers Association and the Automotive Trades Association. To date, oil company executives and individual operators have made no answer to the appeals.

## Tire Chains Improved

Easylon Tire Chains, said to be the only continuous tire chain on the market that can be installed on the tire without jacking up the car, moving it, or reaching behind the wheel to connect the ends, have been improved for the 1937-38 season, according to information received by the manufacturer, Woodworth Specialties Co., Binghamton, N. Y. Uses 8 cross chains instead of 7, two connections in the outer side chain and a swivel at the middle point of the inner chain. A pair of rubber adjusters is furnished with each pair of chains.

## Graham

(Continued from page 28)

hr. capacity standard and 120 amp. hr. for radio installation. The battery is mounted under the hood and fitted with a special "bottle" expansion chamber for each cell to take care of electrolyte expansion in the under-hood atmosphere.

Graham has directed special attention to a more rigid connection between the body and frame due to the use of a very wide and long body. The chassis frame has been made two inches lower through its center section and is heavily reinforced at the X-member by the introduction of a deep center member crossing through the center of the X-member and tying into the side rails. Due to the use of outrigger body mountings, the brackets are attached to the side rails only at points which are specially braced. The front end, over the front cross-member is a special braced structure which houses the radiator core and serves to tie the cowl framing directly into the frame, as illustrated.

# Oldsmobile

(Continued from page 32)

while the throttle is held substantially open. This attachment is standard on the Eight.

Minor refinements, naturally, are found here and there although the service history last year was so good that no marked changes have been required. The most significant details are found on the lower support arm bearings. On the inner hinge point, i. e., where it is attached to the front cross-member, they have adopted a hardened bearing with oil-resisting synthetic rubber seals. Similarly, oil-resisting rubber seals are fitted in the lower support bearing at the knuckle so as to provide a permanent oil seal.

The Eight steering wheel and the new instrument board for both Six and Eight are outstanding in their distinctiveness. As illustrated, the Eight steering wheel has only one horizontal bar attached to the rim with an arched member on each side. This provides perfect visibility for the instrument panel and affords an unusually secure grip on the wheel. This wheel is standard on the Eight but is supplied on both models when the automatic transmission is specified. With automatic transmission, the steering column is fitted with the hand shifting lever and controls; also with a small sector noting gear positions.

## Auto Products Company To Move Headquarters

The Auto Products Co., Cedarburg, Wis., manufacturer of hub caps and other replacement parts, is preparing to move its factory to Whitewater, Wis. There it will occupy the plant of the Whitnall Conveyor Co., which also moves to a new location.

Following the change, the Auto Products Co. will substantially expand its force of workmen.

# 'HALLOWELL'

*Lifetime* EQUIPMENT



Fig. 992

once planted, stays put, oftentimes occupying floor and wall space which could have been used to better advantage. The handles swing down and out of the way when not in use, and, to prevent shimmying, the casters do not swivel. *Write for Bulletin.*

## **"HALLOWELL" Semi-Portable WORK BENCH OF STEEL**

In a way it suggests a wheelbarrow; grab the handles and trundle the "HALLOWELL" around anywhere. Let go, and it lands on its plain feet, when at once it becomes a perfectly steady work bench . . . on the very spot you want it—to be moved away again, quickly, easily — so different from ordinary benching, which, oftentimes occupying floor and wall space used to better advantage.

And out of the way when not in use, and the casters do not swivel. *Write for Bulletin.*



**Fig. 732**  
Pat'd. and  
Pat's. Pending

## **"HALLOWELL" STEEL WORK BENCH**

Strong, rigid, with one piece, smooth steel top, easy to keep clean. Of welded construction, they can't get wobbly—and can't splinter or burn. Best of all, they're inexpensive. Of the 1368 types and sizes, there's one made exactly for you. *Bulletin gives details.*



**Fig.**  
**1112**

## 'HALLOWELL' STEEL TOOL STAND

**A Stand that can be locked, yet is always open for inspection as to its contents.**  
**Portable—able to be moved from job to job—wherever it's required! No wonder hundreds are used in the motor industries, where its convenient features suit it perfectly to so many needs.**  
**There's a type for every purpose—and your copy of our Bulletin will give you the details.**

## "HALLOWELL" STEEL BENCH DRAWERS

**Can't shrink, swell, stick or jam. Wears far better, lasts much longer than wooden drawers. Has dirt and dust proof cover, and convenient tray for small precision tools. *Get Bulletin.***

# STANDARD PRESSED STEEL CO.

## BRANCHES

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**INDIA**

**JENKINTOWN, PENNA.**

**Box 561**

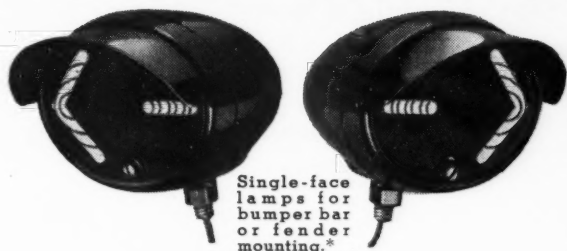
## BRANCHES

CHICAGO  
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SAN FRANCISCO



# PROMOTE SAFER DRIVING SELL GUIDE DIRECT-SIGNAL LAMPS

*There's Profit in It—for YOU*



Single-face lamps for bumper bar or fender mounting.\*

**G**UIDE Direct-Signal Lamps for indicating right and left turns offer you an opportunity for profits as well as to promote safer driving. Every passenger car and truck owner should use these lamps to clearly indicate right and left turns.

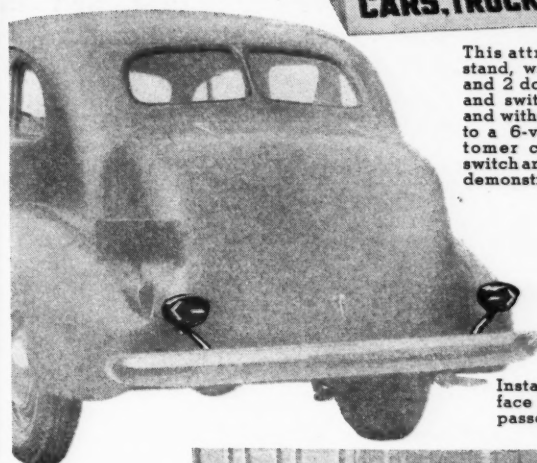
Guide Direct-Signals are carefully designed and engineered to provide positive operation under all driving conditions. The control switch is conveniently mounted on the steering column. A turn of the switch indicates a right or left turn by an arrow in a special amber lens, clearly visible, day or night—in rain, snow, sleet or fog. A flasher warning light, built into the switch, comes on with the signal but remains out when burned-out bulbs or other electrical failures occur.

Long life and dependability are built into Guide Direct-Signal Lamps in their sturdy construction and high quality materials.

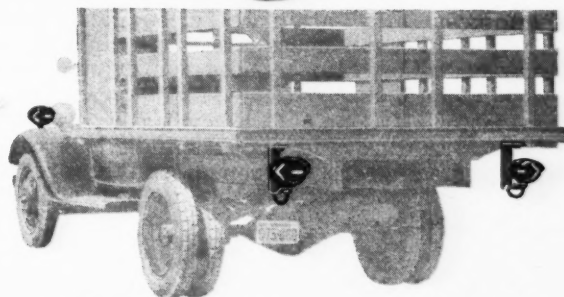
Order a supply of Guide Direct-Signals from your nearest Authorized Guide Lamp Distributor or United Motors Branch.



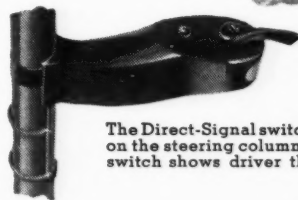
This attractive display-stand, with 2 single-face and 2 double-face lamps and switch, comes wired and with leads to connect to a 6-volt battery. Customer can operate the switch and see an effective demonstration of signals.



Installation of single-face Direct-Signals on passenger car.



Illustrating mounting of single-face Direct-Signals on rear of truck, and double-face signal on front fender.



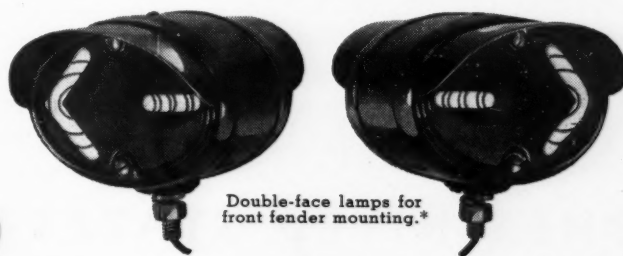
The Direct-Signal switch is conveniently mounted on the steering column. An indicator lamp on the switch shows driver that signals are operating.

# Guide

LAMP DIVISION  
General Motors Corporation  
Anderson, Indiana



Guide Lamps



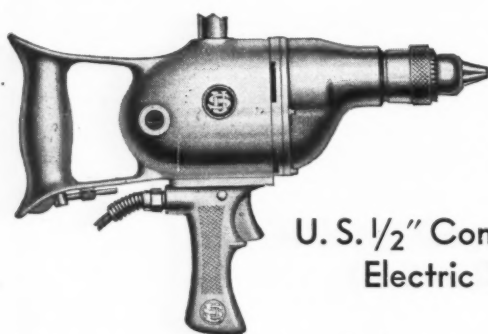
Double-face lamps for front fender mounting.\*

\*Flush and side body mountings also available.



# The Better Shops All Use U. S. ELECTRIC TOOLS

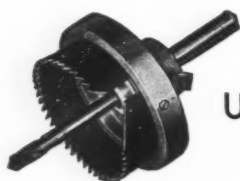
Thousands of mechanics in thousands of shops everywhere today are using United States Electrically-Driven Tools because they represent the best in mechanical equipment for the better motor repair establishments. Forty years of experience has gone into their making that they might insure better work in less time at no additional cost.



U. S. 1/2" Commander  
Electric Drill

A sturdy, compact and perfectly balanced drill, designed and used for all-around service. Motor powered for intermittent service for tough drilling in metal or wood. Can also be used for driving hole saws, wood augers, etc.

Universal motor. D. C. or A. C., 60 cycles or less. Ball bearings on armature and chuck spindle. Chrome-nickel alloy steel gears, hardened, run in grease. Heavy duty 2-pole enclosed switch with lock for holding in "ON" position.

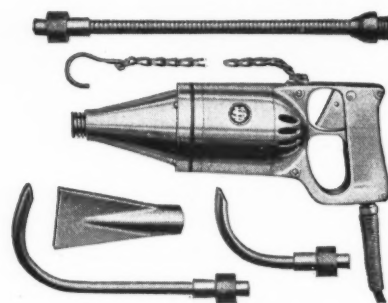


U. S. Rotary Hack Saw  
Type PS

Ideal for use with the U. S. 1/2" Commander drill for installing heaters in automobiles. Made in 30 sizes—3/4" to 5"; cuts 3/4" deep. Uses 1/2" electric drill for saws up to 3 1/2" diameter, 5/8" electric drill for saws 3 3/4" to 5" diameter.

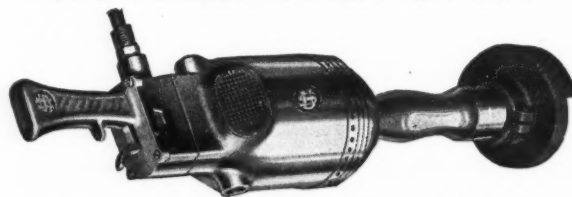


U. S. Electric  
Heat Gun



Welcome cold weather with this quality, compact, portable heat blowing unit. Gives instantaneous heat, generated to a maximum temperature of 450°, when and where you need it for thawing frozen grease in transmissions and differentials; thawing radiators, water pumps, hose connections; drying spark plugs, ignition systems, etc. Universal motor, direct or alternating current, 60 cycles or less, 110 volts only. 1,000 watt heat unit. Underwriters' approved cable and plug.

U. S. Portable Surface Grinders



A versatile tool for grinding, buffing, polishing, sanding down castings, dressing up gas and arc welds, removing paint from automobile bodies, springs, chassis, etc., in the shop. Equipped with air cleaner, which prevents dust and dirt from entering motor, and dust-proof switch. Grinder is light and durable. Motor operates on direct or alternating current, 60 cycles or less. Sizes 2 1/2", 4", 5", 6", 8".

This is but a small sample of all there is to know about United States Electrical Tools. We can tell you much more in our free catalog. It is yours for the asking.

**THE UNITED STATES ELECTRICAL TOOL CO.**  
Cincinnati, Ohio, U.S.A.



# Plug Edison for profit

*...and here's how  
you'll make it!*



Only  
**Edison**  
has this Built-In  
Leak-Proof  
Gasket

- 1 Edison spark plugs cost you less, yet retail at the same price as other first line spark plugs.
- 2 Edison spark plugs are not sold by chain stores, mail order houses or any type of cut-price competition.
- 3 Edison is a better spark plug... easier to install and giving better service. The new patented and exclusive leak-proof gasket is the most important spark plug engineering development of recent years.
- 4 Edison is a name with a significance that brings ready acceptance from car owners. National advertising is continuously broadening this prestige.
- 5 Edison supplies you with merchandising helps that identify you as an outlet for quality merchandise at the right price.

The actual experience of thousands of dealers proves that the Edison name, plus the exclusive patented Edison Spark Plug features, plus the protection against cut-price chain store competition, plus Edison merchandising helps, greatly increases spark plug sales—but even if you don't sell a single plug more than you're selling right now, you'll make more money because with Edison you have a greater profit on each and every plug that you sell.

Your interests are best served by the manufacturer who has cast his lot with the independent dealer—who refuses to expose you to the inroads of cut-price competition—who delivers a product that leads the industry in engineering improvements and can be counted on to "measure up" on the toughest kind of service. Get the complete Edison story from your jobber today. We're satisfied to leave the verdict to your own good common sense.

Years have been devoted to developing compression tight spark plugs and compression tight engine blocks, but never before could you be certain of a compression tight connection between them. This new spark plug with the leak-proof gasket is the only design that insures a 100% tight connection.

The Edison Built-In Leak-Proof Gasket can not move out of correct position. The plugs are easier to install and, because the concentric fit absolutely assures a gas tight seal, performance is improved and spark plug life is lengthened.

EDISON-SPLITDORF CORPORATION · West Orange, New Jersey

ONE OF THE  
*Thomas A Edison*  
INDUSTRIES

# Chrysler

## IN THE LOW -



Now . . . more than ever . . .  
the greatest dealer opportunity  
in the industry!

**BIGGER . . . and a beauty!** That's the new Chrysler Royal for 1938. It has three inches more wheelbase than the 1937 Royal.

Look at that proud, commanding radiator! Note the jewel-like modeling of the radiator grille . . . the graceful union of hood and fenders and the streamlined headlamps!

Inside, beauty again! The instru-

ment panel . . . new steering wheel and its ring-type horn control . . . superb upholstery in short-nap mohair or broadcloth.

More power! A thrifty new Gold Seal engine, with 95 horsepower . . . silky smooth with Floating Power!

Glorious roominess! 119 inches of wheelbase. 96¼ inches from windshield to rear window! A 49

inch rear seat! The most spacious luggage capacity you ever saw!

High-priced riding comfort . . . long wheelbase . . . scientific weight distribution . . . Aero Hydraulic Shock Absorbers . . . independently sprung front wheels.

Safety *All-Steel Bodies* . . . Chrysler hydraulic brakes . . . valve seat inserts . . . finger-touch steering . . . silent-synchronized gear-shifting . . . with Automatic Overdrive optional.

Chrysler's top-ranking standards . . . extra precision operations to assure reliability and long life.

Truly, for 1938, Chrysler again tops 'em all in the low-priced field!



# Sweeps On PRICED FIELD!



THE BEAUTIFUL, high-powered Imperial for 1938! More fine car for the money than America ever saw!

Long famous as Chrysler's top-ranking car, the great Imperial is now in the medium-priced field!

Under that long, impressive hood, a new, bigger engine . . . the most thrilling in Chrysler history! The electrifying response of 110 horsepower...cradled by Floating Power...made trigger-quick by advanced dual carburetion.

The proud, commanding beauty that comes from added length and size! Wheelbase increased to 125 inches . . . for low-swung smartness and grace . . . for the roominess of true fine-car luxury!

Deep, wide, chair-high seats!

Beautiful appointments! Matchless riding ease...the buoyant, gliding smoothness of longer wheelbase...balanced weight distribution...independently sprung front wheels...and Aero Hydraulic Shock Absorbers.

The safety and reliability of Chrysler's great engineering features . . . all at their finest expression. Safety All-Steel Bodies...hydraulic brakes . . . steering and gear-shifting perfection that makes this big, powerful car as effortless as the breeze. Automatic Overdrive is optional.

You'll want to drive this split-second performer . . . you'll thrill to its ability, marvel at its price!

Every year, Chrysler becomes a richer financial opportunity for the dealer. The Two New Beauties for 1938

create a new peak. The bigger, finer Royal sweeps on in the low-priced field. The still greater Imperial offers phenomenal performance at a medium price. The stately Custom Imperial continues to surpass in the luxury market existing in every town. And the new Plymouth outstrips all values in the lowest-priced field. Literally EVERYBODY is the Chrysler dealer's prospect.

Naturally, demand for the franchise is keener than ever. Inquiries on file receive preference. Address Chrysler Corporation, Chrysler Sales Division, Detroit, Michigan.

★ ★ ★

☆ NEW 1938 ROYAL . . . 95 horsepower, 119-inch wheelbase. Ten body types.

☆ NEW 1938 IMPERIAL . . . 110 horsepower, 125-inch wheelbase. Six body types.

☆ NEW 1938 CUSTOM IMPERIAL . . . 130 h. p., 144-inch wheelbase. Three body types.

# AN EXTRA 10%!



*Yes! We're  
Propositioning You!*

You can add an extra 10%  
or more to your net profit  
by investing less than \$100!

This covers everything—necessary equip-  
ment, merchandising plan, all wrapped up  
in one package and backed up by a na-  
tional consumer advertising campaign—  
with full and complete protection for you  
in your territory!

It's ready for you right now. It's going  
great guns in many territories already. You  
can have it piling up that extra 10% and  
more in *your* business within a few days.

**ACT NOW!**

**FOR 1 CENT**

you can mail a postal card for the full details!

**MARVEL PRODUCTS CORPORATION**

6 North Michigan Avenue

**CHICAGO**

**ILLINOIS**



# Ultra HIGH FREQUENCY IGNITION



THE  
1<sup>ST</sup> MAJOR  
COIL IMPROVEMENT  
IN 20 YEARS!

NOTE THESE TEST  
PROVEN FEATURES

- MODEL H-1012 12 VOLT  
HEAVY DUTY  
TOP RPM 2500
- MODEL H-1006 6 VOLT  
HEAVY DUTY  
TOP RPM 2500
- MODEL M-2006 4-6 CYL. ENGINES  
TOP RPM 3600
- MODEL S-3006 8 CYL. ENGINES  
TOP RPM OVER 3600
- INCREASED HORSEPOWER  
THRU PERFECT IGNITION
- QUICK POSITIVE STARTING
- NO DESTRUCTIVE BURNING OF  
BREAKER POINTS
- LONGER SPARK PLUG LIFE
- PERMITS USE OF LOWER GRADE FUEL

WRITE FOR CATALOGUE

**ELSBERT MANUFACTURING CO., INC.**

353 WEST GRAND AVE.

CHICAGO, ILL.



# HE WAS



GIVE ME TWO GALLONS OF GAS

TO HIMSELF:  
WHAT'S HE TRYING TO DO,  
WEAN IT?



1

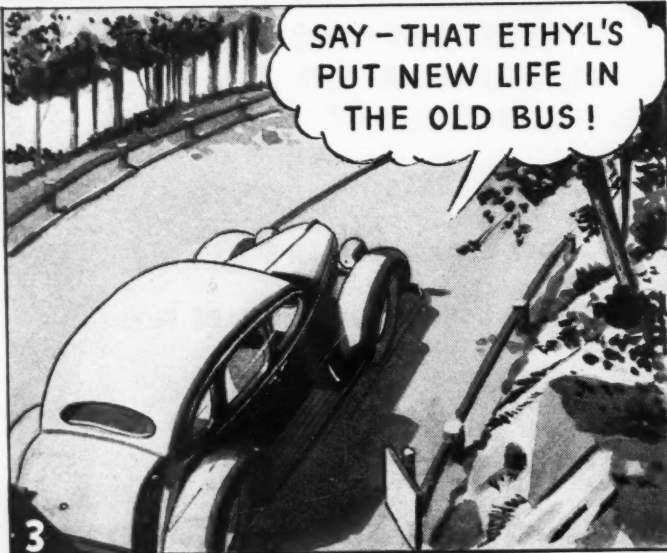
HOW ABOUT TWO GALLONS OF ETHYL? IT'LL

GIVE YOU A BETTER RUN FOR YOUR MONEY

OKAY -  
I'LL BE A SPORT



2



3

SAY - THAT ETHYL'S PUT NEW LIFE IN THE OLD BUS!



4

1½ GALLONS LATER

FILL HER UP WITH ETHYL

YES, SIR!

TO HIMSELF:  
PINCH ME -  
I'M DREAMING



# A TWO-GALLON MAN — BUT HE FILLS HIS TANK NOW!



**H**ERE'S a way to handle those "two-gallon" big shots that really works. Give them the low-down on getting more out of every gallon they buy—more real value out of the car they own.

It's easy. Tell 'em to fill up with Ethyl and then have their car dealer adjust the motor for maximum performance. That simple prescription will save gas and oil, improve road performance...reduce gear shifting on hills, make passing easier and safer.

Remember—your Ethyl contains more anti-knock fluid\* than the best regular-grade gasoline. It's a quick-starting gasoline. It's double-tested for all-around quality. It's so much better that station after station reports more "fills" when they push their *first-grade*:—Ethyl!

\*Containing tetraethyl lead

**A BETTER RUN  
FOR YOUR  
CUSTOMERS' MONEY**

## MAKE FRIENDS WITH





*Out December 15th . . .*

## *the 1938 Chilton*

*Flat Rate and Tune-Up Manual*

The only Flat Rate that will have 1938 cars

*Wait for your Chilton Man to call.*

*Be sure the name CHILTON is on the Flat Rate you buy!*



# BIG BATTERY CABLE BUSINESS IS HERE CHECK UP! STOCK UP! AND LIFT UP THE FLOORBOARDS



## 2. STOCK UP! →

Stock up with Packard, and display the Packard Battery Cable Merchandiser Groups *where people can see them*. Packard battery cables, featuring the exclusive Korelug connections and Hi-Press terminals, are full-size No. 1 and No. 0 gauge. They give 26% to 100% more starting capacity than undersize cables.



## ← 1. CHECK UP!

Check up on your Packard stock and see what items you need to take care of the big winter battery cable replacement business. Right *now* is the time of year when car owners are *battery-conscious*—they want quick starting and protection against electrical breakdown for the cold weather ahead.



## ← 3. LIFT UP!

Lift up the floorboards—that's where your profits lie right now. Show car owners the power-stealing corrosion of the battery cables and ground straps. Then replace with Packard, and you'll make a satisfied customer and a satisfying profit with each sale.

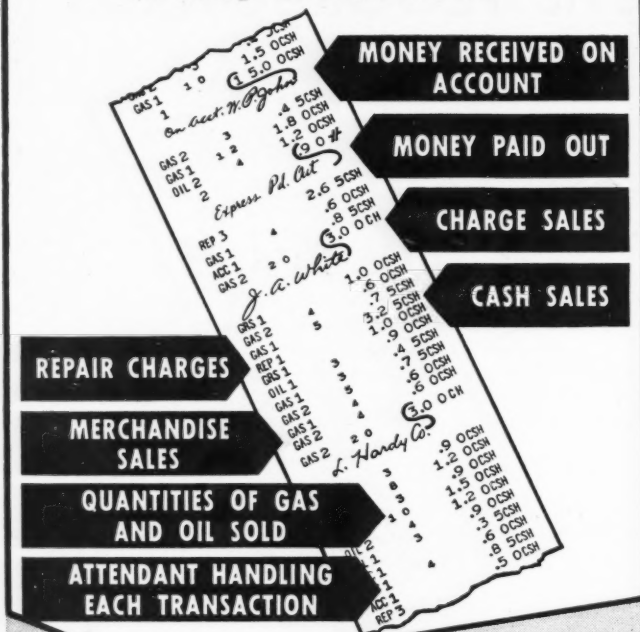
**Packard**  
REG. U.S. PAT. OFF.  
TRADE MARK

*It's Good Business to Buy from Your Packard Jobber*

THE STANDARD WIRING EQUIPMENT OF THE AUTOMOTIVE INDUSTRY

# BURROUGHS CASH REGISTERING MACHINE

**PROTECTS CASH AND STOCK**  
with a detailed record of  
every transaction



**MONEY RECEIVED ON ACCOUNT**

**MONEY PAID OUT**

**CHARGE SALES**

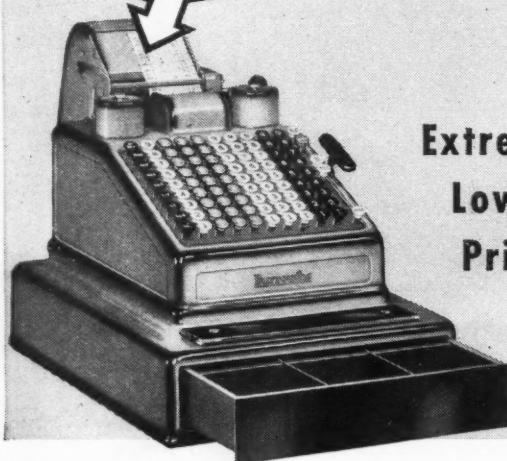
**CASH SALES**

**REPAIR CHARGES**

**MERCHANDISE SALES**

**QUANTITIES OF GAS AND OIL SOLD**

**ATTENDANT HANDLING EACH TRANSACTION**

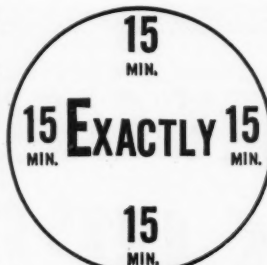


**Extremely  
Low in  
Price!**

Here's a new Burroughs that affords positive protection of cash; keeps a detailed record of every transaction, and identifies the type of service rendered or commodity sold as well as the attendant who handled the sale. With it you can quickly balance cash or take stock at any time. It's fast, it's simple, it's surprisingly low-priced. Investigate. Mail the coupon, or telephone your local Burroughs office.

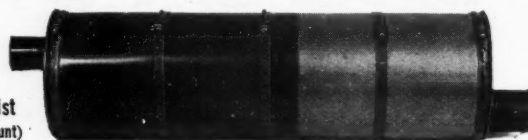
## MAIL THIS COUPON

Cash Register Division  
Burroughs Adding Machine Company  
6206 Second Boulevard, Detroit, Michigan  
Send me information on Burroughs Cash Registering Machine.  
Name \_\_\_\_\_  
Street \_\_\_\_\_ City \_\_\_\_\_



**15 MINUTES  
WILL REPAIR**  
A BLOWN MUFFLER  
ON 1929-1938 CHEVROLETS  
ON ANY FORD V-8  
AND MANY OTHER CARS!

Model  
51  
\$1.65 List  
(40% Discount)



## HOOK-ON REPAIR JACKET DOES THE JOB

Don't let blown-out mufflers buffalo you any longer! Stock these guaranteed Hook-On Muffer Repair Jackets, and take care of the job in 15 minutes flat—by the clock!

No rattle! No holes to drill! No special tools needed! Just hook it on, and you'll be amazed at the improvement. Noisy, split, rusty or blown-out mufflers sound like new again. Clamps included, perforated for use with any diameter.

No. 51—For 1929-1938 Chevrolet, Dealer Cost \$0.99 each.  
No. 50—Universal Model. Dealer cost, box of 6, \$5.40.  
No. 49—For Ford V-8's. Dealer cost, box of 12, \$9.72.

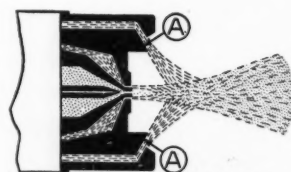
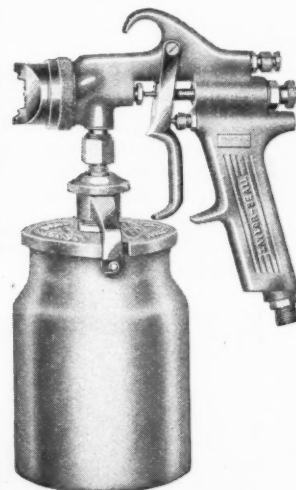
**SAVE POSTAGE! We'll ship parcel post prepaid if you send cash with order, or specify C.O.D. shipment.**

## SPRING SPECIALTY COMPANY

12 N. Eighth Avenue,

Maywood, Illinois

**How the New  
Saylor-Beall  
Commercial  
Spray Gun  
cuts  
spray  
painting  
costs**



The paint material leaves the nozzle orifice enveloped in a tube of air, as in an ordinary spray gun. Then, instead of being played upon by a number of air streams from several side ports, it receives two blasts that are softened as they slide off baffles (AA), spreading the pattern. Only these two auxiliary air streams are required to complete atomization and produce the ideal oblong pattern. Better coverage is secured, in shorter time, with a considerable saving in air.

Ideal for service in body plant, service station and paint shop. Write for circular.

## SAYLOR-BEALL MANUFACTURING COMPANY

1511 East Philadelphia Ave.

Detroit, Michigan



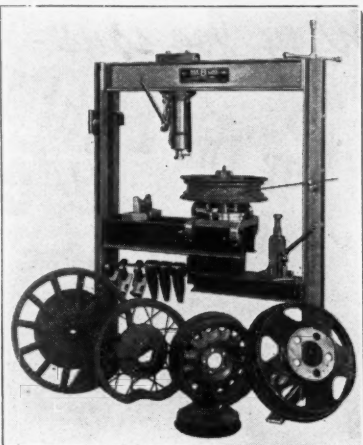
## "THAR'S GOLD IN THEM THAR WHEELS"

Millions of automobile wheels need straightening.

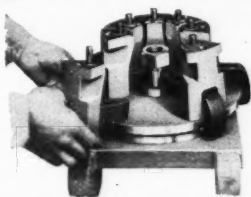
The new Bee-Line Wheel Straightener, with its universal hub, NOW makes it profitable to feature the truing of wheels.

With this machine it makes perfect wheel straightening much cheaper than the purchasing of new wheels.

Let us send you our new catalog that is filled with information about this new, extra-money service, and our self-liquidating plan.



Speed and efficiency. The completeness and the universal features of the new Bee-Line Wheel Straightening Machine enable shopmen to straighten all wheels and hubs in a most precise manner.



The Universal Hub on this new Bee-Line Wheel Straightener represents the greatest single innovation. The Universal Hub is adaptable for servicing wheels of the future as well as those of the present.

**BEE-LINE COMPANY**

Davenport

Iowa

# Flash

## 3 QUICK SELLING ITEMS

**FROM A COMPLETE CHEMICAL LINE**

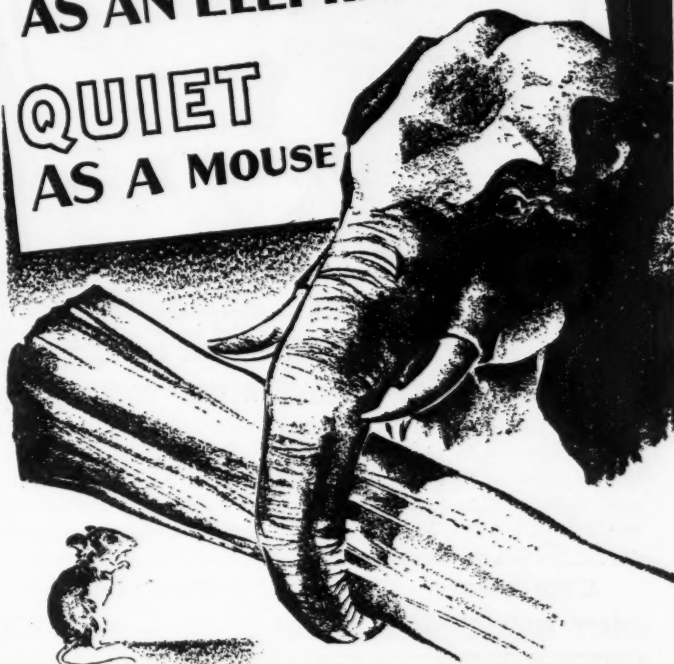
FLASH HYDRAULIC BRAKE FLUID is the leading item in its field. Its perfect mixing qualities and satisfactory operation at all working temperatures are two exceptional features. FLASH HYDRAULIC BRAKE FLUID will not affect brake cups or brake mechanism. Equally popular in the Flash line is FLASH GASKET DOPE and FLASH FRICTION TAPE. Every dealer should stock these three items because they are real money-makers.

FREE FLASH DISPLAYS are available to all Flash dealers. They are designed to help you sell. Ask for them when you order.

**FLASH LABORATORIES**  
1858 W. Kinzie St., Chicago, Ill.

## POWERFUL AS AN ELEPHANT

## QUIET AS A MOUSE

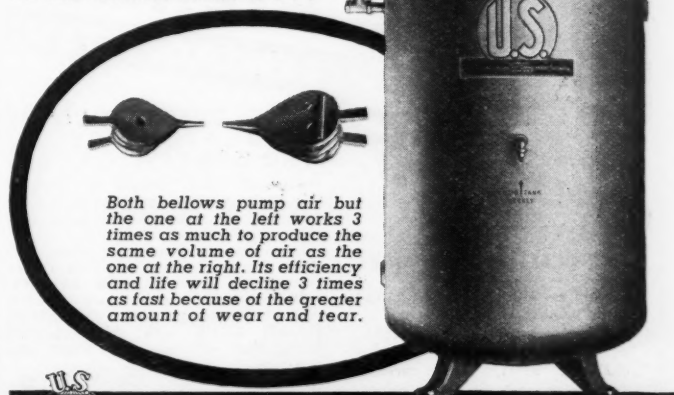


## A WORLD BEATER

● U. S. MK 600 Series air compressors operate from 18 to 105% slower than all other 1½ H. P., 2 stage compressors.

By actual tests this big, powerful, husky, cool-running U. S. compressor averages 65% less revolutions per minute (covering the entire field) to produce the same displacement of free air. That's not only economy in operation and efficiency but assured longer life with less oil consumption and less carbon.

The World's Most Popular Compressor in the most popular size for garages, car dealers and service stations . . .



Both bellows pump air but the one at the left works 3 times as much to produce the same volume of air as the one at the right. Its efficiency and life will decline 3 times as fast because of the greater amount of wear and tear.



# U.S.

**AIR COMPRESSOR  
COMPANY...CLEVELAND, OHIO**

AIR COMPRESSORS • AIR TOWERS • HYDRAULIC LIFTS  
GREASING EQUIPMENT • CAR WASHING SYSTEMS

**A**



**"JUNIOR" Graph-Air Gun**

A squeeze of the Flexophone tube and Dixon's Microfyne Powdered Graphite instantly reaches the spot requiring lubrication. About 900 applications for . . .

**30¢**

**A REFILLABLE**

**Graph-Air Gun**

A rubber applicator, operates by squeezing, for continued, long-lasting service as a spray gun for Dixon's Microfyne Powdered Graphite. Sold full of graphite for . . .

**75¢**

8 Refills 50¢

## A pair you can BET ON!

**TO SQUELCH SQUEAKS • REMOVE RATTLES • STOP STICKING**

It's a safe bet that Dixon's Microfyne Powdered Graphite sprayed from either one of these handy guns will apply lasting lubrication to anything that squeaks, rattles or sticks. Just the thing for auto door locks and dove tails, ignition switches, hood catches and lachings, springs, window slides, tire rims, gaskets, top cylinder lubrication and countless other uses.

**Easy to Sell**

**Handy to Use**

**JOSEPH DIXON CRUCIBLE CO., Dept. 47 C-G, Jersey City, N. J.**

**DIXON'S GRAPH-AIR GUNS**

WITH MICROFYNE POWDERED GRAPHITE

INVESTIGATE OTHER DIXON "FAMOUS FIFTY" GRAPHITE PRODUCTS

**Certified**

**FOR ACCURATE**

**PERFORMANCE AND**

**DEPENDABILITY**

**Convince**

**YOUR CUSTOMERS**

**Increase**

**YOUR PROFITS**

**WITH THE NEW**

**Portable**

**NIEHOFF**

**"GENEROMETER"**



### PERFORMANCE FEATURES

- \*Simplifies all generator, regulator and relay adjustments.
- \*Accurately checks generator charging rates, field currents, regulators, and relay.
- \*Indicates lamp, radio, and other accessory load readings.

BRANCH: 1342 S. FLOWER, LOS ANGELES, CALIF.



**C. E. NIEHOFF & CO.**

230 W. SUPERIOR ST. CHICAGO, ILLINOIS

**\*ENGINEERED FOR ACCURATE PERFORMANCE AND DEPENDABILITY\***

**MAKES EVERY VOLTAGE REGULATOR • RELAY AND GENERATOR TEST**

No repair shop should be without this business-building tester that turns customer satisfaction into sales and extra profits.

It analyzes charging rates, field currents, load readings, high resistance connections, etc. Provides an accurate diagnosis in a minimum of time. ACT NOW—swing into the EXTRA PROFIT ZONE with this precision tester that will pay for itself and pay you.

Ask your JOBBER TODAY for this new Niehoff Precision Generometer. If he can't supply you, write, wire or 'phone and we'll gladly mail our new catalog in colors with latest price list.

*Wiry Joe says -*

**"For the Light That Fails -**

**sell CRESCENT**

*Wiring!"*



Corroded connections and worn cables cause many headlight troubles at this season. There's a splendid opportunity to increase your cable sales and profits now through good headlight work. Crescent Wiry Joe Spooled Cable not only assures a satisfactory job, but brings you the extra profits that come with volume sales.

Ask for catalog.



LIGHTING HARNESSES SPOOLED CABLE LIGHT SOCKET ASSEMBLIES  
IGNITION CABLE SETS BATTERY CABLES TROUBLE LIGHTS


Largest Independent Manufacturer of Replacement Automotive Wiring in U. S. A.

**500% sales increase**

**KINNEY & McLAUGHLIN POINT THE WAY**

You've probably cleaned a lot of windshields, FREE. Now, how about making some real profit from this service. Just stick a K & M Wiper in your pocket and hand it to your customer while cleaning his glass. He'll show immediate interest in this different and better blade—its faster, thorough cleansing, without smears, streaks or scratching—its fine quality sun and weather-proofed rubber that will not harden, crack or split—its stainless steel metal parts—its automatically adjustable bracket that permits raising or lowering to suit the driver's line of vision. No other blade has all these features. No other blade wipes so clean or lasts so long. You'll make plenty of profitable sales. Write us for literature with all the facts about K & M Blades.

**KINNEY & McLAUGHLIN CO.**  
AKRON  
OHIO



*It's a better blade with the inner cross bars*

**Super-Tension BALLOON TYPE WIPER BLADES**

**OUTLAST OUTWIPE ANY OTHER BLADE**

Manufactured under U. S. Pat. No. 2090702

ASK YOUR JOBBER for the K & M Assortment. Includes 12 complete blades in 3 size lengths, individually boxed and packed in display carton. Costs you only \$2.52—Makes you \$1.64 profit.



## Chrysler

(Continued from page 23)

ber is riveted to members which join with the front crossmember, form box sections with the sidemember, and extend to the members forming the front part of the X. From this point short reinforcing crossmembers are used between the rear members of the X and the frame sidemembers. The rear of the X members is extended along the sidemembers to form box sections over the rear axle. Two rugged crossmembers are used at the rear of the frame.

Tapered rear leaf springs of "Amola" alloy steel are continued, with silent "U" thread shackles at the rear ends and rubber cored bushings at the front. The rubber-mounted front sway-bar is continued on all models. In addition, the Imperial and Custom Imperial feature a new transverse stabilizer at the rear. It is fixed to right side of the rear crossmember directly behind the rear axle, at one end, and to the spring seat of the left rear spring, at the other end.

Steering gear is of the worm and roller type as before, being completely rubber suspended. On the Royal and Imperial, individual tie-rods connect from the pitman arm. On the Custom Imperial, a cross drag link connects to an intermediate arm which operates the individual tie-rods.

Safety glass is standard all around. Airwheel tires with ribbed tread in front are standard on all lines and provide freedom from tire noise with independent front springing. Life-guard inner tubes, consisting of a heavy-duty tube with a secondary inner type served by the same valve, are standard on the Custom Imperial and are available at extra cost on the Royal and the Imperial.

All-steel bodies with a one-piece steel top are continued. In sedans, an X-brace located behind the rear seat back is welded to body sides to provide additional rigidity. New sliding block type dovetails are said to eliminate door rattles. The bodies are fully insulated thermally and acoustically. The steel roof, upper rear quarter and cowl sides are insulated to protect against heat and cold and to prevent any possibility of noise or drumming.

### Machined Parts Catalog

The Machined Parts Corp., 6209 Hamilton Ave., Detroit, Mich., has made available to their distributors and service stations a new catalog and ignition manual. It contains factory tune-up specifications for all cars built since 1927, and gives the parts specifications for distributors, generators, starting motors and coils.

### Black & Decker

#### Appoints Treslar

The appointment of Glen H. Treslar as assistant sales manager of the Black & Decker Mfg. Co. has been announced by Mr. S. Duncan Black, president of the company.

Mr. Treslar has been connected with the organization for over fifteen years in the capacities of territorial salesman, territorial branch manager and

again we say:-  
**Don't BUY Labor...  
SELL IT!**



"Where's the Boss?"  
"Down the line gettin' a carburetor fixed."

## HYGRADE'S "Contain-All" Kits For CARBURETORS & FUEL PUMPS

IF YOU go "down the line" to have carburetors and fuel pumps repaired—BY ANOTHER SHOP—you are handing the other fellow the big end of your profit!

To make money, DON'T BUY LABOR—SELL IT! Keep carburetor and fuel pump repairs in your own shop. This branch of overhaul pays handsomely—and Hygrade's Contain-All Kits enable you to take care of practically every internal reconditioning job on an investment that's negligible.

Write for particulars and catalogs

**HYGRADE PRODUCTS CO.**  
516 W. 34th St., NEW YORK CITY

All the parts for a COMPLETE Overhaul, insuring a THOROUGH Job!



FUEL PUMP PARTS



CARBURETOR PARTS



SERVICE PARTS FOR:  
Carburetors, Fuel Pumps, Speedometers,  
Shock Absorbers, Temperature Gauges, etc.

more recently as supervisor of the Cleveland and Detroit areas. He is to have his headquarters at the company's home office at Towson, Maryland, assisting Mr. Robert D. Black, sales manager.

## Fiat

(Continued from page 27)

a compression ratio of 6 to 1, develops better than 32 brake horsepower at 4000 r.p.m. and is designed to give better than 35 miles to the gallon operating economy. It has a bore and stroke of 2.68 in. and 2.95 in. respectively. The "1500" has a six-cylinder motor developing 43 brake horsepower at 4000 r.p.m. and built to give 30 miles per gallon gasoline mileage. Both motors have overhead valves.

Independent front wheel suspension, hydraulic shock absorbers and long semi-elliptical rear springing help to give these cars excellent roadability and comfort.

Like the "500," the larger cars feature safety glass, four-wheel hydraulic brakes, four forward speeds, synchromesh transmission with silent third, torque-tube drive, single-plate, dry clutch and precision manufacture.

Wheelbase of the "Balilla" is 95½ in.; of the "1500," 110 in. Custom bodies by Viotti are available in the "Balilla" and "1500" lines. The "Balilla" standard sedan delivers fully equipped for \$795. Consumer price of the "1500" is \$1195.

## Make REPLACEMENTS With STANDARD EQUIPMENT



Interlox Metal Hose is standard equipment on leading automobiles, trucks, tractors and buses, carburetors, battery cables. Be sure you make all your replacements with Interlox Metal Hose. Order Interlox Metal Hose from your jobber today for the business it will bring you tomorrow.

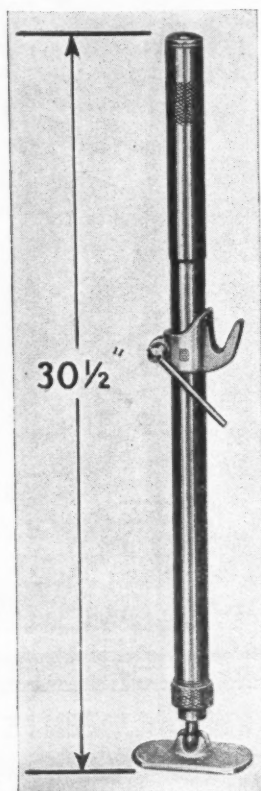
We also manufacture Universal Gasoline Hose Couplings, Flexible Metal Conduit, Brass Fittings, Castings, Stampings, Jigs, Dies and Specially Designed Tools and Machinery. Write for further information.

**INTERNATIONAL METAL HOSE CO.**  
10709-15 QUINCY AVE., CLEVELAND, O.

Distribution and service facilities have already been set up at strategic points throughout the United States by The Advance Corporation, American importers and sole distributors for Fiat, so that 24-hour service on parts is available.



# A "NATURAL" for Christmas



Pat'd Dec. 15, 1936—Other Pats. Pending

## THE ACE-HY HYDRAULIC BUMPER JACK

START NOW to suggest this Man's Gift — and watch sales climb—because it's a practical gift that will appeal to every car owner.

Ace-Hy is the Modern Jack for the modern car—No kneeling—No crawling under car—no projecting levers—Nothing to put together.

You can build WINTER SALES with Ace-Hy—start now by getting that Christmas business with the ideal Christmas gift.

PRICE \$6.95

Pacific Coast \$7.50

**VULCAN MFG. CO.**  
SAINT PAUL, MINN.



## Buick

(Continued from page 19)

strong rectangular section. The ends are pivoted in rubber bushing.

It is claimed by Buick engineers that the new suspension gives all of the desirable features of rear independent springing without its mechanical complications and disadvantages. The back seat ride is measurably improved over all kinds of roads and the new cars have unusual stability on the road under severe maneuvering situations.

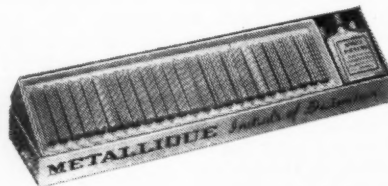
With improvement in suspension, it has been possible to effect further improvement in steering on the 40 and 60. Steering geometry has been altered by eliminating the transfer arm used last year and devising a "direct cross steering" hook-up in which the motion is transmitted directly from the pitman arm to a long tie-rod extending to the right hand steering knuckle. A short tie-rod is attached to the long rod, slightly to the right of pitman arm connection. The steering hook-up on the 80 and 90 remains the same as last year.

Body mounting has been greatly improved by insulating the body structure against the transfer of noise and vibration, as well as freeing it from frame weave. This year Buick has gone back to the straight side rail so that body mounts on all models are on outriggers mounted on the side rails. The novelty in the mounting comes from the fact that the entire rear end of the body is freed from frame end deflections at the rear corners by a mounting at the center of the rear cross-member, this being completely rubber-insulated.

Body mounting on the 80 and 90 follows the same pattern as the 40 and 60 except that there are five sets of mounting brackets ahead of the rear kick-up, due to greater frame length, and two insulated center mountings at the rear, one on each of the two rear cross-members.

### Car Monograms

Probar Corp., 558 Freeman St., Orange, N. J., announces a new development in attractive metal initials with a nickel silver non-tarnish finish which may be quickly applied to any flat hard surface. A special cement prevents Metallique Initials from rub-



bing or washing off. This new product, known as Metallique Initials, makes expensive hand-lettering unnecessary. They are packed in a handy, conveniently indexed box with attractive dealer displays and literature.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of MOTOR AGE, published monthly at Philadelphia, Pa., for October 1, 1937.

State of Pennsylvania } ss.  
County of Philadelphia }

Before me, a notary public in and for the State and county aforesaid, personally appeared J. S. Hildreth, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Motor Age and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Chilton Company, Chestnut & 56th Sts., Phila., Pa.; Editor, W. K. Toboldt, 221 S. Walnut St., West Chester, Pa.; Managing Editor, W. K. Toboldt, 221 S. Walnut St., West Chester, Pa.; Business Manager, J. S. Hildreth, 429 Owen Road, Ardmore, Pa.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Chilton Company, Chestnut & 56th Sts., Phila., Pa.

Holders of more than 1% of the capital stock outstanding of Chilton Company: C. A. Musselman, 260 Sycamore Avenue, Merion Station, Pa.; F. J. Frank, Laontaka Way, Madison, N. J.; F. C. Stevens, 325 West End Avenue, New York, N. Y.; J. S. Hildreth, 429 Owen Road, Ardmore, Pa.; G. H. Griffiths, 165 Montclair Avenue, Montclair, N. J.; E. B. Terhune, 160 East 48th Street, New York, N. Y.; John Blair Moffett, 1608 Walnut Street, Philadelphia, Pa.; Wm. A. Barber, 185 Summit Lane, Bala-Cynwyd, Pa.; C. S. Baur, 76-66 Austin Street, Forest Hills, N. Y.; J. H. Van Deventer, 12 Phillips Place, Yonkers, N. Y.; Dorothy S. Johnson, 3109 Woodley Road, Washington, D. C.; Lillie Lindsay, 142 East 71st Street, New York, N. Y.; Anne E. Tomlinson, Bankers Trust Company, Fifth Avenue & 44th Street, New York, N. Y.; Ethel G. Breen, Trustee u/w of Charles W. Anderson, 71 West 35th Street, New York, N. Y.—Beneficiaries: Robert C. Anderson, Percival E. Anderson, Charles W. Anderson, Jr., Annie L. Clark; John Blair Moffett, 1608 Walnut Street, Philadelphia, Pa.—Agent for J. Howard Pew, J. N. Pew, Jr., Mabel P. Myrin, Mary Ethel Pew; Elizabeth J. Artman & Elwood B. Chapman, Executors of Estate of James Artman, Deceased, 930 Real Estate Trust Building, Philadelphia, Pa.—Beneficiaries: Franklin Artman, Vera Watters, Alvin Artman, Elizabeth J. Artman, Marion A. Pratt, George W. Pratt, by assignment, Edwin Moll, by assignment; Bankers Trust Company and Wilfred T. Pratt as Trustees u/w of Eugene Sly F.B.O. Beulah Belle Sly, 16 Wall Street, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is (This information is required from daily publications only.)

JOS. S. HILDRETH, V.-P., Business Manager.

Sworn to and subscribed before me this 28th day of September, 1937.

JOSEPH W. FRITZ

(My commission expires Feb. 19, 1939.)

[SEAL.]





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**MODEL 7  
A SPRAY  
GUN THAT  
REALLY  
PAINTS**

**Makes Used Cars  
Like New. See Your  
Dealer TODAY!**

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**SEALER**

Is the complete sealer for cracked water  
jackets, cylinder heads, valve ports, leaky  
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internal leak in a water system. It can be  
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New Type Universal Blade, fits all arms. Blade  
rolls in action, no bending of rubbers. 7-ply  
wiping features give 100% wiping, therefore, clear  
vision at all times.

**HACKETT AUTOMOTIVE ACCESSORIES CORP.**  
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Mfrs. of Wiper Arms, Dual Wiper Attachments, In-  
side Wipers, License Plate Frames, Cigar Lighters,  
Magnetic Trouble Lights, Shimmy Stops, Parking  
and Fender Guides, etc.

## Lincoln-Zephyr

(Continued from page 30)

are aimed toward more quiet operation. The valve-lifters now are of the self-adjusting silent type, operated from the lubrication system, as on the large Lincoln cars. The shape of the combustion chambers has been modified for smoother operation, with a slight gain in power output also the result. The engine mountings now are of the compression-cup type, which permits the elimination of the fore-and-aft strut rods formerly used to transmit torque-tube end thrusts to the frame and to maintain the correct longitudinal position of the engine. A new cooling fan of higher efficiency is also used. The crankshaft location for the fan is continued, the vibration damper being in unit with it.

Other mechanical changes include the use of angle-mounted rear spring shackles, in place of the transverse stabilizing rod and vertical shackles used in 1937 cars; a transmission synchronizer of the "blocker" or "blocking-out" type between second and high speeds, which insures synchronization of the mating parts before engagement; new 18-in. steering wheel, one inch larger than formerly; battery located under the hood, and voltage-regulation type generator.

### Dawson Appointed Thor

**Representative in Phila.**

Joe Dawson, well known to the automotive world as a former winner of the Indianapolis 500-mile classic, has been recently appointed Philadelphia representative of the Independent Pneumatic Tool Co. He will handle sales of Thor portable electric tools in that area.

### New Hobart Catalogue

**Available to Trade**

Hobart Brothers Co., Hobart Square, Troy, Ohio, manufacturers of arc welders, recently announced their new catalogue. The booklet, entitled, "Arc Welding with the new 40 Volt Simplified Arc Welder," shows the uses of Hobart's new Motor Horsepower Control in modern welding equipment.

Readers of MOTOR AGE may receive a free copy of this catalogue by writing to the Hobart Brothers Co.

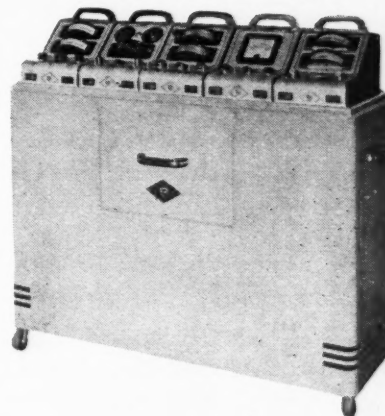
## A COMPLETE OVER-ALL

**engine check-up  
in only**

**TEN MINUTES**

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## POTTER ENGINE ANALYZER



This opens the road to **REAL PROFITS FOR YOU**. After the quick 10-minute check-up you know what adjustments, parts and repairs are necessary and can quote prices accordingly.

**Complete Technical Information** for tuning every car furnished with every complete Engine Analyzer.

Write for free details of how **YOU** can make a quick, accurate engine test within only **TEN** minutes. It will increase your service sales.

## THE POTTER COMPANY

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NORTH CHICAGO, ILL.

U. S. A.



## CAR LIFE MUFFLERS

**Unconditionally Guaranteed  
for the Life  
of the Car!**

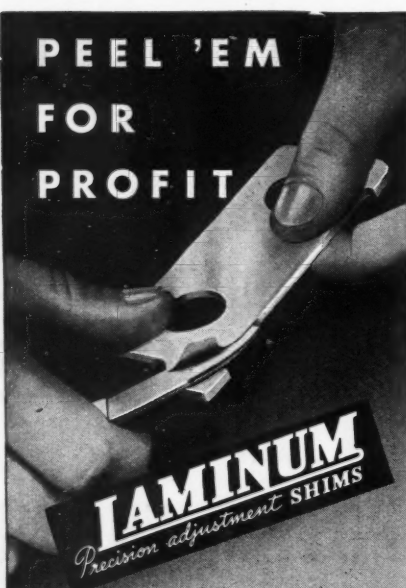
Improved Shell Type. Only  
12 Numbers Fit most  
Cars, Trucks and Buses!



- Leak-Proof!
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1920 S. Michigan Ave., Chicago 2214 Main St., Dallas

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PROFIT**



**BEARING ADJUSTMENTS  
THAT PAY...**

Precision adjustments—quick! Right at the job. No miking, no filing!... Just peel precision laminations from the brass LAMINUM shim. Standard for all makes of engines. PEEL 'EM FOR PROFIT!

LAMINATED SHIM CO., INC.  
MFRS., LONG ISLAND CITY, N. Y.

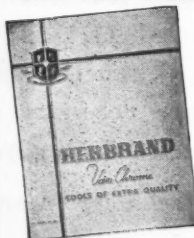
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Ask your jobber  
—or write us.

**THE HERBRAND CORPORATION**  
FREMONT, OHIO

**Be sure it's a  
Genuine  
PUROLATOR**

## Pontiac

(Continued from page 34)

end cell construction mounted under the hood. For the Six, the battery is 15-plate, rated 98 amp. hr. capacity; for the Eight, 17-plate, rated 112 amp. hr.

To assist in making cleaner shifts, as well as to reduce clutch pedal pressure, the clutch pedal now is fitted with an above-center helper spring. Transmission has been altered in some details. Smoother second speed shifts can be made with new two-lobed synchronizer drums of slightly smaller diameter retained with hexagonal springs instead of detent and cushion springs. Countershaft gear bearings are held in place by a perforated spacer which improves lubricant flow.

Knee-action has been improved by the introduction of hardened steel, replaceable threaded bushings and rubber dirt seals for the lower control arm shafts. The pitman arm has been raised  $\frac{1}{4}$  in. on the Six and  $\frac{1}{2}$  in. on the Eight to provide more road clearance.

## Automatic Gas Tank Lock

The Radiator Specialty Co., 311 East Fifth Street, Charlotte, N. C., has introduced Lectrollok, an electrically controlled gas tank cap lock which operates from a button on the instrument panel. The Lectrollok unit consists of the lock, a large chromium cap, both lead and ground wires, and



switch. One model fits all cars. Can be installed in a few minutes, and requires no drilling. No keys required to operate the lock. Retail list price, \$2.75.

## Gear Manual Off Press

Section 3 of the "Manual of Gear Design," by Earle Buckingham, is now available through The Industrial Press, 148 Lafayette St., New York City.

This book not only deals thoroughly with the design of helical and spiral gears, but includes considerable information and data about the cutting of such gears by hobbing, shaping and milling. Even change-gear calculation is included, as required in connection with milling or hobbing on a machine with or without a differential mechanism.

The book contains the formulas and tables required in solving all kinds of helical and spiral gear problems. The price is \$2.50.

## ARROW

DIRECTIONAL SIGNALS

FOG & DRIVING LAMPS

ELECTRIC FLARES

SAFETY EQUIPMENT

The Standard of Safety on  
the Nation's Highways.

Write for Catalog

**ARROW SAFETY DEVICE CO., Inc.**  
Medford, N. J.



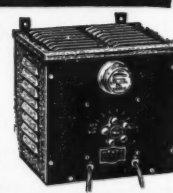
## Handy BATTERY CHARGERS

LOWER OPERATING COST  
MEANS MORE PROFIT FOR  
YOU. No. 6-B Wall type.

6 Battery size.  
Price, without  
bulb.....

**\$24**

WRITE for Bulletins on complete line of "HANDY" chargers, testers and racks.  
**BALDOR ELECTRIC CO.**  
(Electrical Mfrs. for 17 years)  
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**GUARANTEED for 2 YEARS**



## THE TWIN POWER RINGS OF THE International LINE-

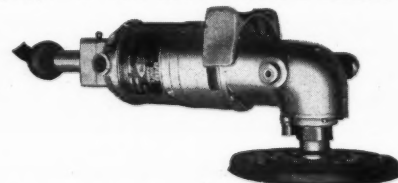


You can safely put your faith in Chief Power Rings, and when you recondition the cylinders, use Super-Scraper sets. The oil mileage will be amazing.

**THE INTERNATIONAL PISTON RING CO.**  
CLEVELAND, OHIO.

## New Sioux Electric Sander

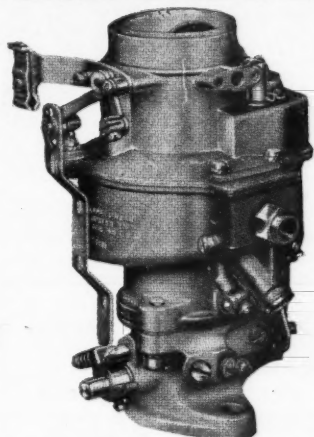
New features have been incorporated in the new No. 1255 2-speed, and the No. 1250 7-in. heavy duty portable electric sanders introduced by Albertson & Co., 3100 Lowell Ave., Sioux City, Iowa, makers of SIOUX equipment. A new air-director guard directs the blast of dust and grit-loaded air away from the operator's face. This guard also serves as a stand for the sander when not in use, protecting the sanding disks from injury. A new fan delivers a consider-



ably greater volume of air, resulting in a cooler-running motor. The cushion drive is a split gear assembly which absorbs shocks and vibration. The No. 1255 uses 7-in. and 9-in. sanding disks and is provided with a gear shifting lever to change speeds—4250 r.p.m. for the 7-in. disk and 3500 r.p.m. for the 9-in. disk.



## LINKERT The World's Outstanding CARBURETOR



An Outstanding New Design for  
**CHEVROLET  
AND  
PLYMOUTH**  
LANGSENKAMP-LINKERT CARBURETOR CO.  
INDIANAPOLIS - INDIANA

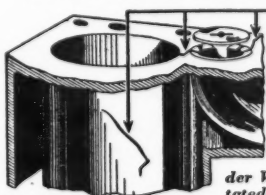
## Get the Facts about this COMPLETE VULCANIZING PLANT in 1 MOLD



An efficient mold that produces perfect vulcanizing. Handles wide range of tire sizes. Perfect insulation—low operating cost. For gas, electric or steam line. Fully guaranteed.

**CHASE MFG. CO.**  
3200 Delmar Bl.,  
St. Louis, Mo.  
*Write for Prices*

## WONDER WELD FAST AND PERMANENT!



Does regular 30-hour repair shop weld job in 30 minutes. Seals every crack permanently. Beware of imitations. Like all good products Wonder Weld is being imitated. Use genuine

Wonder Weld for Guaranteed Results.  
**MILLER MFG. CO.**  
1220 KAIGHN AVENUE CAMDEN, N. J.

## Moto Scoot

VOLUME PERMITS  
NEW LOW PRICES

NOW ONLY **\$89<sup>00</sup>** AND UP  
F.O.B. CHICAGO

Dealers: Some "live" territories still open. Write or wire today for complete information on exclusive territories.

**MOTO - SCOOT MFG. COMPANY**  
Dept. MA-10—219 So. Western, Chicago

## Hypoid Lubes Discussed

At the annual convention of the lubricating grease manufacturers, Mr. H. C. Mougey, chief chemist of the General Motors Research Laboratory, praised the lubricant manufacturers for their efficient work in getting wide distribution of proper hypoid gear lubricants. "It was also recognized," Mr. Mougey stated, "that the lubricant should not be corrosive nor abrasive to steel in the presence or absence of water, and should have desirable properties such as stability in storage and in service."

In a paper presented by Oscar L. Maag, of the Timken Roller Bearing Co., a table was presented showing the iron and copper content of new and used hypoid lubricants of the active sulphur type. This table was as follows:

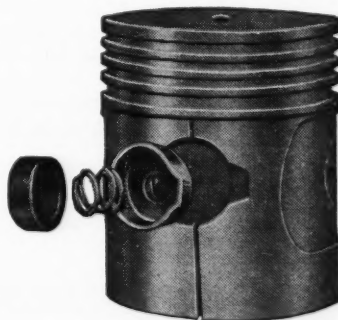
Sample	New Oil		Used Oil	
	% Fe	% Cu	% Fe	% Cu
1	.02	0	.19	.15
2	.01	0	.18	.13
3	.01	0	.04	.02



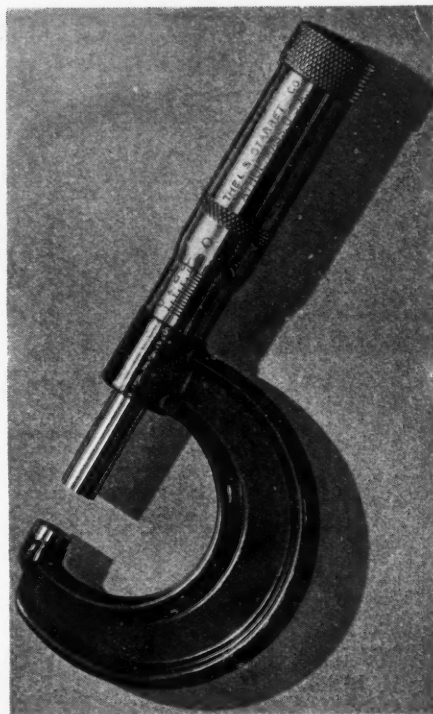
**Blow Wagon** Harry Perry of St. Louis built this Wind-Mobile with odds and ends from an automobile junk pile. The driver is seated in one cabin and the passenger in the other. Between them is an open space with a large fin acting as a stabilizer.

## Holds Piston in Alignment

An inexpensive, simplified type of piston guide, known as "Kant Slap," is being distributed by the Wherry Engineering Co., Des Moines, Iowa. Kant Slap is designed to hold pistons in proper alignment with the cylinder wall, thus assisting in holding rings at right-angles to the cylinder. It is said



to eliminate piston slap, oil pumping and compression loss in any worn cylinder up to .020 in. clearance. Kant Slap may be used in both cast iron and split skirt alloy pistons, and may be easily installed by any mechanic without expensive equipment.



## STARRETT No. 436 a lot of mike for a little money

If you're interested in getting the most mike for your money, take a look at Starrett No. 436. It doesn't have a fancy price tag either. It *does* have genuine Starrett accuracy and the look and the action of a mike made by the World's Greatest Toolmakers.

Your tool dealer has this Starrett Micrometer or you will find it completely described with many other useful tools in the Starrett Automotive Tools Booklet G. A copy sent free on request.

## THE L. S. STARRETT CO.

World's Greatest Toolmakers  
Manufacturers of Hacksaws Unexcelled  
Steel Tapes—Standard for Accuracy  
Dial Indicators for Every Requirement  
**ATHOL, MASS., U. S. A.**

**Use  
Starrett  
Tools**

## Help Car Owners To This New Motoring Aid



### **Sinko** SPIN-UR-WHEEL

See that your customers have this attractive aid to parking, backing and turning. It gives driving a new thrill.

Spin-Ur-Wheel is instantly attachable, fitting any wheel. It comes in five colors, with or without the jewel, and with chrome or enamel base.

Also see that your customers have Bez-L-Ball in matching colors for their gear levers.

### **SINKO TOOL & MFG. CO.**

351-371 N. Crawford Ave.  
Chicago, Ill.



### **Noc-OUT** HOSE CLAMPS THE HOSE CLAMP WITH THE THUMB SCREW

Standard equipment of the automotive industry. Adjustable—one size equals many. Quick tightening, perfect seal. Makes radiators and heaters "Anti-Freeze" tight. Stock up now and be ready for the first cold snap. AT ALL JOBBERS.

**WITTEK MFG. CO.**  
4305 W. 24th Pl., Chicago, U.S.A.

## Water Pump for Chevrolet

A new Seal-Pack water pump for 1937 Chevrolet cars has been announced by Aluminum Industries, Inc., 2416 Beekman St., Cincinnati, Ohio, makers of Permite products. This new replacement pump employs the patented Bakelite Seal instead of the ordinary packing. This feature requires less room than packing, and permits the use of longer bearings. Complete information may be had by writing Aluminum Industries, Inc.

## Walter J. Heinze Now Southern Sales Manager for Nash

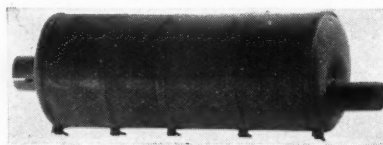
In line with its program of expansion, which provides for intensive development work with distributors and dealers, the Nash Motors Division of Nash-Kelvinator Corporation has established a divisional sales office in Dallas, Tex., it was announced by Courtney Johnson, general sales manager.



Walter J. Heinze, until recently a district representative for the company in the Middle West, has been promoted to the post of southern sales manager, in charge of the Dallas office. Until recently the southern sales manager operated out of the main Nash plant at Kenosha.

## Repairs Blown Mufflers

A wrap-around muffler jacket for all Ford V-8 cars is a new product of the Spring Specialty Co., 4 North 8th Ave., Maywood, Ill. The jacket telescopes to fit any length V-8 muffler



and the overlapping edges allow for all diameters. A quick, inexpensive repair for a muffler that has blown out.

**MAKE MORE MONEY**  
DO BETTER WORK FASTER  
Send for catalog of 150 time-saving tools **Free**  
**National** WRITE TODAY  
MACHINE & TOOL CO.  
JACKSON MICH.

6 CHATHAM, ONT.

**AUSCOLIFT**  
THE INDUSTRY'S NUMBER ONE  
**BUMPER JACK**  
NO GEARS... NO RATCHETS  
NO GREASE OR DIRT  
It Is Non-Hydraulic, Yet Works  
FASTER - SIMPLER - EASIER  
EASTERN LIST PRICE \$4.00—WEST COAST  
10% ADDITIONAL  
Manufactured Exclusively by  
**AUTO SPECIALTIES MFG. COMPANY**  
ST. JOSEPH, MICH... WINDSOR, ONT., CAN.

**50¢** is the  
**NEW LIST PRICE**  
on the **KREGER**  
No. 203 OIL GAUGE LINE  
for Chevrolet  
50% Discount on Initial Order if You Mention  
Jobber's Name.  
**L. F. KREGER MFG. CO. CHICAGO, ILL.**

## Lipe Corporation Expands

W. C. Lipe, Inc., manufacturers of clutches and vibration dampeners, announce the opening of a new plant at West Fayette and Wyoming Streets, Syracuse, New York.

The new plant will be devoted entirely to the manufacture of their heavy duty automotive truck, bus and tractor clutches and vibration dampeners which previously were manufactured at their main plant on Geddes St., in Syracuse.

## CLASSIFIED ADVERTISING

Wanted—Engine Lathe about 14 or 16 inch swing. Cryder Bros., Burns, Ore.

INVENTORS—Protect your rights. Before disclosing your invention to anyone send for free blank form "Evidence of Conception" and in-

structions. Personal attention given all cases. Lancaster, Allwine & Rommel, 415 Bowen Building, Washington, D. C.

Motor Temperature Gauges repaired \$1.50. Missing parts replaced. Originators of this

service. Factory Methods. Radiator Shutter Thermostats repaired \$2.50. United Speedometer Repair Co., Inc., 436 W. 57th St., New York City.

## FOR THE OIL GASOLINE & WATER CONNECTIONS **VELLUMOID**

**VELLUMOID** makes tight connections which stay tight. The name, **VELLUMOID**, is your guarantee of **VELLUMOID** Quality. Accept no substitutes.  
**THE VELLUMOID CO., WORCESTER, MASS.**



FOR THE PAINT SHOP!  
A MODERN—



**DOES BETTER WORK — FASTER**

Eight Stripe Widths 1/64" to 3/16"  
Prices 1.50 2.50 4.50 5.50 8.50  
"A Tool for Every Size Paint Shop"  
Ask Your Jobber or write for literature

**WENDELL MFG. CO.**

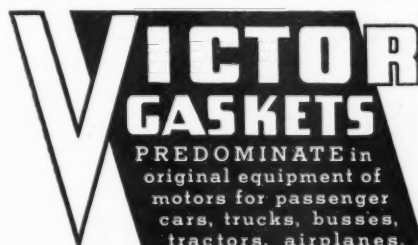
2533 No. Ashland Ave. CHICAGO, ILL.

"Ralpo" Body Metal Cutter



For cutting flat, formed or corrugated sheet metal, straight or circular, 16 gauge and lighter without distorting or burring. Inexpensive, it is a real time and money saver. Priced at \$2.50, remittance with order delivers it anywhere in the U. S. Drop forged and Rockwell tested. Ask your jobber or order direct.

**RALPH W. POE • CANTON, ILL.**  
44 White Court



**VICTOR MANUFACTURING & GASKET CO.**  
P. O. BOX 1333 5750 ROOSEVELT ROAD, CHICAGO, U. S. A.  
WORLD'S LARGEST GASKET MANUFACTURER

**SEALED POWER  
PISTON RINGS**

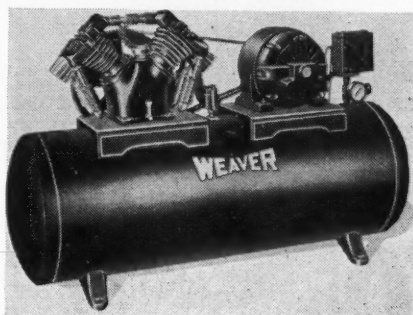
Best in  
Old Cars!



Best in  
New Cars!

**Weaver Adds Line  
Of Compressors**

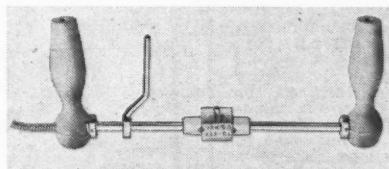
The Weaver Mfg. Co., 2177 South Ninth St., Springfield, Ill., has announced a series of single and two stage air compressors in sizes from 1/2 to 5 horsepower. Carefully designed to meet the requirements of the average garage, the new compressors employ an elaborate system of inter-coolers and aftercoolers, and are said to deliver air to the storage tank less than 20 deg. above room temperature, thus avoiding shrinkage due to excessive cooling in the tank, which low-



ers pressure and compels the unit to start again for recompression. Unnecessary "frills" which do not contribute to the efficiency or durability of the compressors have been avoided, thus enabling the manufacturer to place the outfits on the market at an attractive price. Distribution is being made through Weaver jobbers throughout the country.

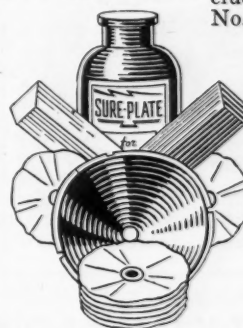
**TU-ETH Electric Tire Regroover**

An electric tire regroover with several special features has been introduced by Vanderbilt-Osborne Corp., Raymond-Commerce Building, Newark, N. J. Operating from 110-volt AC or DC outlet, the heating element is carried in the steel tube. The bracket holding the knife is adjustable on the tube, and the knife is adjustable for the required depth of the



cut. The guide arm is also adjustable on the tube to permit positive directional control. Standard equipment for each regroover includes two brackets and twelve knives, and knives are supplied that will cut a groove from 1/8 in. to 3/8 in. wide. Price \$18.

Complete kit includes: 1/2 gallon No. 102 Sure-Plate Solution, 2 Fine Buffing Wheels, 2 Coarse Buffing Wheels, and 1 Bar Coarse Compound, 1 Bar Fine Compound, 1-12 oz. bottle of Silver Polish.



**"Upped Sales  
\$35.00 in 2 days**

just resilvering headlight reflectors." You can do as well, or better, with Sure-Plate.

A car dealer writes: "We use Sure-Plate for used-car reconditioning and in our Service Department. In only 2 days last week, our Service Department took in \$35.00 just resilvering headlight reflectors."

Sure-Plate is a gold mine for merchandising minded repairmen. Get in this virgin field NOW. Turn dim, tarnished reflectors into bright, safe ones again, with Sure-Plate. Generous profits. Investigate . . . write!

**SURE-PLATE**

for HEADLIGHT  
RESILVERING



Make BIG money repairing cracked blocks. Cracked valve parts, cast iron or aluminum cylinder heads or water jackets, no longer mean tedious teardowns. Instead pour Sure-Weld in the top hose connection of a hot block. Sure-Weld forms into all cracks—nowhere else—makes a quick, permanent repair. Customers gladly pay your price for such service. Pint size, \$2.00 list; \$1.40 to trade. See your jobber, or write Sure-Rite Products Co., 6010 Camac St., Philadelphia, Pa. Warehouse stocks—1910 Grand Ave., Kansas City, Mo., and 1406 So. Grand Ave., Los Angeles, Calif.

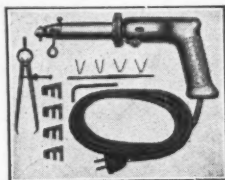
**SURE-WELD**

for Cracked Valve Ports, Cylinder Blocks and Water Jackets

**IT PAYS TO PUSH  
WINTER LUBAID**

For safe lubrication at 50° below zero, motorists are demanding Winter LUBAID. It affords quick, easy starting, keeps rings and valves free, saves gas and oil. Write LUBAID COMPANY, Milwaukee, Wis.

## USE the CHAMPION TIRE GROOVER For Bigger Profits



Cuts quickly, easily, accurately. Adjustable for both depth and width of cut. Adjustable guide. Removable heating element. Uses either A-C or D-C. Air cooled pistol grip handle. One hand control. Cuts long grooves all around tire in less than one minute. Ideal for use with New Champion Stand which mounts

and releases tires quickly. Revolves toward operator. Held by pawl and ratchet, leaving operator's hands free to groove.

The two Champions are a money-making combination. Full information free. Write today for illustrated folder.

**O. E. THOMPSON & SONS**  
505 RIVER STREET YPSILANTI, MICH.

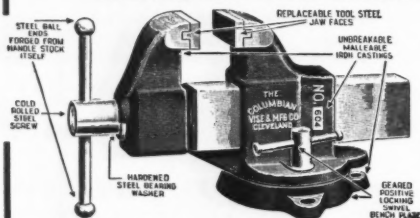
# TEMCO

has IMPROVED this popular line of BALL-BEARING Drills ( $\frac{1}{4}$ "- $\frac{3}{4}$ " Grinders and Drill Stands.

Write for LIBERAL Profit-Sharing Jobber Plan  
**TEMCO ELECTRIC MOTOR CO.**  
LEIPSIC, OHIO U. S. A.

## COLUMBIAN

### Malleable Iron Machinists' Vises



**COLUMBIAN Machinists' VISES** are Unbreakable

**THE COLUMBIAN VISE & MFG. COMPANY**  
9017 Bessemer Ave. Cleveland, Ohio

are designed to give the service required of quality tools. They embody special features which insure necessary strength, accuracy and durability. There's a wide range of Columbian Vises, designed for all purposes. Recommended for general purpose use in all shops having a wide range of work. Send for catalog.

## BBB CARBON PRODUCTS

BRUSHES METAL GRAPHITE  
SHAPES WELDING CARBON

The experience of 25 years of carbon engineering available on request.

**Becker Brothers Carbon Co.**  
3450 South 52nd Avenue  
CICERO, ILLINOIS

## NEW BRAKE SPRING TOOL



Does brake lining jobs quicker! One end removes springs in a jiffy. Other end snaps springs back in place just as easily. Ask your jobber for KRAEUTER'S No. 909 Quick-Action Brake Spring Tool or write Dept. "W". Cadmium plated; 9" long; weight 8 oz.; \$1.25 each.

*An indispensable tool for all jobs where the springs fit over the post*

**KRAEUTER & CO.**  
(Pronounced KROY-TER)  
NEWARK, N. J.

Manufacturers of Highest Quality Pliers and Tools Since 1860—"Ask Any Mechanic"



## Maintenance Men

who read

# MOTOR AGE

Account for

# 85% plus

of all the business

done in this

## Important Field





## Added PROFITS

• No wonder Gardiner Solders are equally popular with car manufacturers, body builders, garages, repair shops and jobbers. Records everywhere prove that their unvarying high quality and superior performance make them most profitable to sell and use.

Produced in volume . . . under the most modern and efficient manufacturing methods . . . Gardiner Solders are time and material savers because they work faster and go farther. Yet they cost less than "nameless" solders. The Gardiner Line includes Acid and Rosin Core Solders in various alloys and core sizes . . . body, bar and wire solders . . . Permanent Lining Babbitt metal . . . and special solders to meet any specification requirement.

PACKED IN  
1, 5, AND  
20-LB. SPOOLS



4839 S. Campbell Ave., Chicago, Ill.

THE LINE THAT LEADS  
TO PROFITS

# REMCO

SHOP EQUIPMENT

Hydraulic Presses, Wrecking  
Cranes, Car Washers, Jacks, Trestles,  
Creepers, Oil Spray Guns, etc.

Write for FREE literature.  
MANLEY PRODUCTS CORPORATION  
State & Hay Sts., York, Penna.

Exide makes it easier and  
simpler to sell profitably

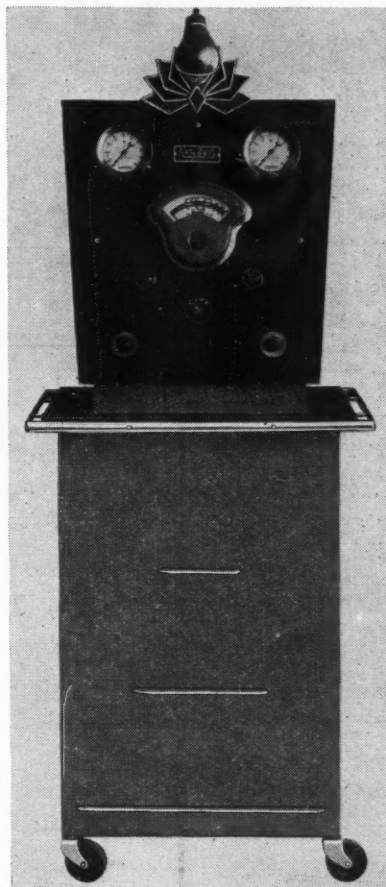
THE ELECTRIC STORAGE BATTERY CO.  
Philadelphia

The World's Largest Manufacturers of  
Storage Batteries for Every Purpose  
Exide Batteries of Canada, Limited, Toronto



## Master Fuel Analyzer

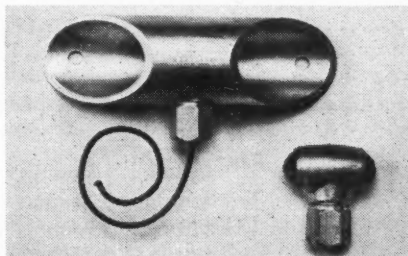
A new instrument for testing carburetor mixture, fuel pump suction, fuel pump pressure and muffler back



pressure has been announced by Langan & Hoke, Inc., 1638 W. Hunting Park Ave., Philadelphia, Pa. All tests are made on the car under actual operating conditions and without removing the unit from the car. Instrument is beautifully finished in Crackle, with a portable cabinet to accommodate battery and test lines hidden from view. Trimmed with chrome guard rail. New price \$195.00.

## Truck Clearance Light

Cox Mfg. Co., Angola, Ind., has recently placed on the market an entirely new type of electric clearance light for trucks, known as the Hartline indestructible. It is made of a 7-in. length of tubular steel with each end cut away at sharp angles. Bulb and



lenses, available in any color combination, are located in the middle, supported by a shock-proof metal tee which forms the mounting. Full visibility to the front and rear is assured, plus a wide arc to the side.



**Flint** the Loss-Proof  
Compression  
SPARK PLUG!

Highly endorsed by fleet owners because of their uniformly excellent performance, longer service and lower cost per mile. Made in the correct types for every motor.

Order from your jobber!  
Write for literature!

C. V. S. Manufacturing Co.  
Flint, Michigan

Radiator, Battery Repairing  
and all sorts of soldering  
jobs easily done with

# TORIT

ACETYLENE  
TORCH No. 23

Simply connect to  
Presto tank. Price,  
including a set of 4  
tips, \$6.75. Order  
from your jobber.

TORIT MFG. CO.

290 WALNUT ST., ST. PAUL, MINN.



# BUELL

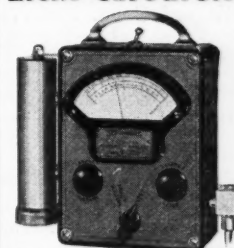
High Pressure Air Horns

These Fine Quality Safety Signals  
Actually Increase Driving Safety. A  
Good Investment in Accident Prevention.  
Used on Greyhound Busses.  
Way-A-Way—The New Passing  
Signal for Night Driving.

NEW LITERATURE READY

BUELL MANUFACTURING COMPANY  
2987 COTTAGE GROVE AVE. CHICAGO

## Licks Carburetor Problems



Serving thousands of mechanics throughout the nation, this Stromberg Exhaust Analyzer removes the costly trial and error method of carburetor adjustment. Tests made in two minutes—right before your customers' eyes—prove what's wrong.

It's a real money maker—sells job after job—because the customer MUST BELIEVE the evidence. Write for full information.  
STROMBERG MOTOSCOPE CORP.,  
2709 Belmont Ave. Chicago, Ill.

## Oil Renovators

K & S Motor Products, Inc., 18 Hillside Ave., Hillside, N. J., claims outstanding results from its new dilution extractor known as "Oildex" and from its triple-action oil cleaner, "Filtrex." Oildex takes fumes from the crankcase, filters out all dirt, heavy particles and excess water, delivers lubricated, volatile vapors to the carburetor. The Filtrex cleaner is of the heavy-duty type with replaceable cartridge containing a filter bag, cellulose element and wool filter disc.

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## Because the "2-in-1" A. S. I.

—advance advertising orders are being received in heavy volume for the December issue of Motor Age (the Annual Service Parts and Equipment Number), each advertisement to be rebroadcast FREE in the same month's issue of Motor World Wholesale (the Marketing Annual for 1938).

Because both these magazines will be distributed at the Automotive Service Industries Show in Chicago, beginning December 6, earlier closing dates are necessary, and advertisers are asked to bear in mind the following:

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## Show Issue is a "Natural"—

1. Advertising plates for the Two Big Show Issues at the Cost of One must be supplied in duplicate—one for Motor Age, the other for Motor World Wholesale—since both publications will be on the presses at the same time.

2. Cover, color and special position forms, including island half-pages, will close Friday, November 19. Final black-and-white forms will close Wednesday, November 24.

Get your reservation in TODAY!

### CHILTON COMPANY

Chestnut & 56th Streets

Philadelphia, Pa.

## "NORMA-HOFFMANN"

### ANGULAR CONTACT and SELF-ALIGNING PRECISION BEARINGS

Longer life and more mileage are built into these rugged PRECISION Bearings, which come with heavy-duty bronze retainers. You can use them in your hardest replacement jobs and be certain your customers will get the extra-serviceability that marks every PRECISION Bearing in the NORMA-HOFFMANN line of 108 distinct series. Write for the Price List, and name of nearest distributor.

**NORMA-HOFFMANN BEARINGS CORP'N., STAMFORD, CONN., U. S. A.**

PRECISION BALL, ROLLER AND THRUST BEARINGS

**CHEVROLET • FORD • PLYMOUTH**



## **STANDARD GENERATORS**

First of all—**RELIABILITY!** You can bet your bottom dollar that every Standard Generator built by The Armature Co. will stand up and *deliver the goods!*

Even under extreme conditions of heat and wear! Each is completely torn down, rigidly inspected, and very carefully rebuilt—to exact car manufacturers' specifications. Each carries a ninety day guarantee! It pays you to exchange the old generator for a rebuilt Standard Generator. For all popular cars. And inexpensive too.

**ECONOMICALLY EXCHANGED**



**BUILDERS OF GOOD ARMATURES SINCE 1919**

**SEE US AT THE PALMER HOUSE DURING THE A. S. I. SHOW IN CHICAGO**





Watch the smile of satisfaction that new-car pep brings to the owner of the old car. Lynite T-Slot Pistons of LO-EX Alloy have just been installed, so it's a smile that's going to wear well. Here's why:

Lynite T-Slot LO-EX Pistons give last-

ing improvement in engine performance because their lighter weight reduces bearing pressures; they insure maximum heat flow, minimum oil consumption, less carbon; their low coefficient of expansion permits close clearance.

Specification Tables Tell the Story of Lynite LO-EX Piston Acceptance.

ALUMINUM COMPANY OF AMERICA, 2175 Gulf Building, Pittsburgh, Pennsylvania.



LYNITE PISTONS—A PRODUCT OF

**ALCOA · ALUMINUM**

CAST ONLY BY ALUMINUM COMPANY OF AMERICA





# Flexible **POWER** PISTON RING SET-UP

A 10-year-old Hup had been using a quart of oil every 50 miles and getting only 11 miles to the gallon of gas. After installing a Flexible Power Piston Ring Set-up, it only needed a

quart of oil every 1800 miles and gas mileage increased to 14 miles per gallon. Could any customer ask for better performance?

## KOETHERIZING

For top performance on any ring job, a simple, speedy method like Koetherizing the pistons can't be beat. Not only does this nationally famous treatment resize accurately but it makes pistons permanently collapse-proof. We've proved it with over a million worn pistons.

*Write for full information*

KOPPERS COMPANY  
American Hammered Piston  
Ring Division, Baltimore, Md.

A KOPPERS PRODUCT

# American Hammered Piston Rings

★ THE CHOICE OF THOSE TO WHOM TRANSPORTATION IS A BUSINESS ★



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